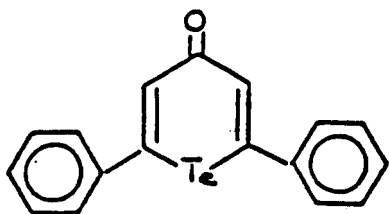


**CLASS 540, ORGANIC COMPOUNDS -- PART
OF THE CLASS 532-570 SERIES**

SUBCLASSES

- 1** This subclass is indented under subclass 1. Compounds under Class 532, ... which are heterocyclic carbon compounds containing a hetero ring having chalcogen (i.e., oxygen, sulfur, selenium or tellurium) or nitrogen as the only ring hetero atoms.

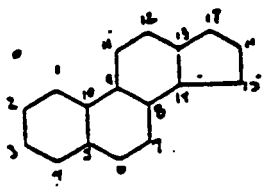
(1) Note. An example of a compound provided for herein is:



SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, appropriate subclasses for the destruction of hazardous or toxic waste.

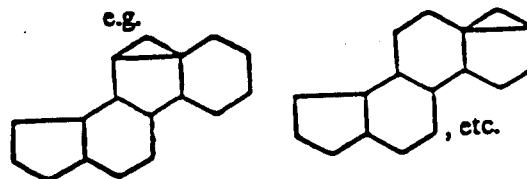
- 2** This subclass is indented under subclass 1. Compounds which additionally contain the cyclopentanohydrophenanthrene ring system, which may contain double bonds between its ring members; i.e.,



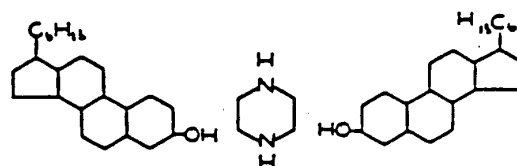
(1) Note. The phenanthrene portion of this tetracyclic ring system cannot be completely aromatic; it must be hydrogenated to some degree.

(2) Note. In the indents hereunder which refer to positions, the numbers shown in the definition are employed.

(3) Note. Although the following structure types are properly classified elsewhere as pentacyclo ring systems and not here as cyclopentanohydrophenanthrenes, they have been crossed into appropriate cyclopentanohydrophenanthrene subclass(es) to make them available to the steroid examiners:



(4) Note. An example of a compound provided for herein is:



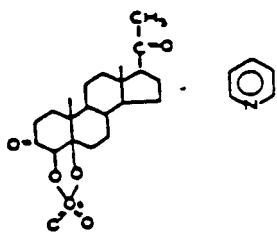
SEE OR SEARCH CLASS:

514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 172+ for a medical composition including a steroid compound with a hetero ring.
552, Organic Compounds, subclasses 502+ for nonheterocyclic cyclopentanohydrophenanthrene compounds.

- 3** This subclass is indented under subclass 2. Compounds which include aluminum or a metal having a specific gravity greater than four.

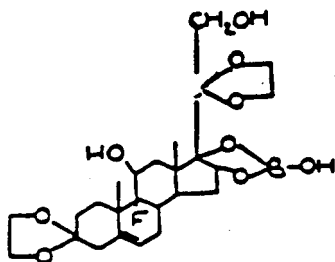
(1) Note. Arsenic is considered a heavy metal.

(2) Note. An example of a compound provided for herein is:



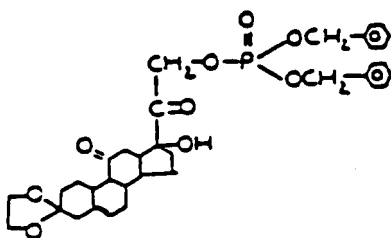
- 4 This subclass is indented under subclass 2. Compounds which contain boron or silicon.

(1) Note. An example of a compound provided for herein is:



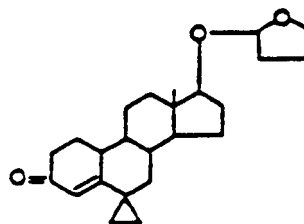
- 5 This subclass is indented under subclass 2. Compounds wherein phosphorus is attached directly or indirectly to the cyclopentanohydrophenanthrene ring system by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



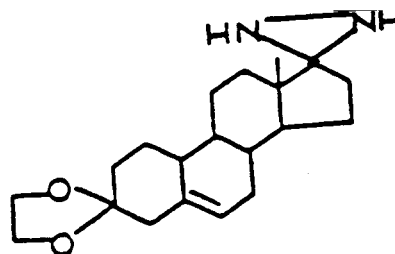
- 6 This subclass is indented under subclass 2. Compounds which contain a spiro ring system.

(1) Note. An example of a compound provided for herein is



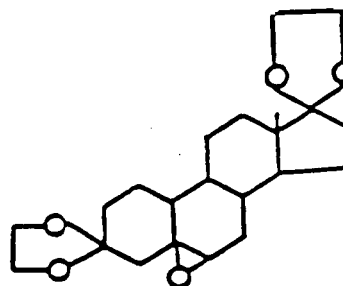
- 7 This subclass is indented under subclass 6. Compounds which contain at least two discrete spiro atoms.

(1) Note. An example of a compound provided for herein is:



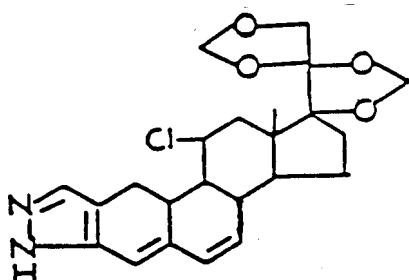
- 8 This subclass is indented under subclass 7. Compounds wherein the cyclopentanohydrophenanthrene ring system is part of a polycyclic ring system having at least five cycles.

(1) Note. An example of a compound provided for herein is:



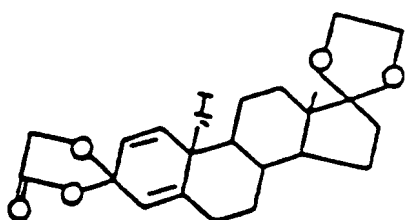
- 9 This subclass is indented under subclass 8. Compounds which a nitrogen containing hetero ring is one of the cyclos of the polycyclo ring system.

(1) Note. An example of a compound provided for herein is



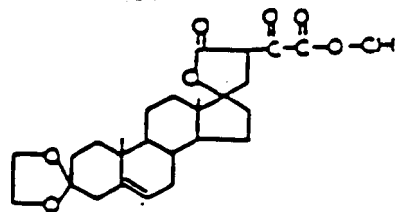
- 10 This subclass is indented under subclass 7. Compounds in which the cyclopentano-hydrophenanthrene ring system shares spiro atoms with two hetero rings, each of which contains two oxygens.

(1) Note. An example of a compound provided for herein is:



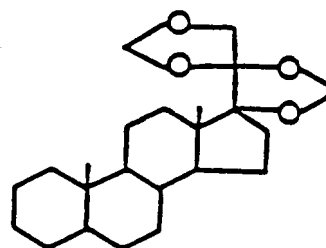
- 11 This subclass is indented under subclass 7. Compounds in which the cyclopentano-hydrophenanthrene ring system shares a spiro atom with a lactone ring; i.e., - - O -, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), and is part of the ring.

(1) Note. An example of a compound provided for herein is



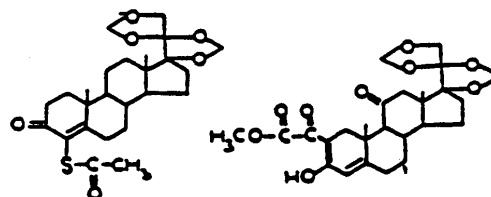
- 12 This subclass is indented under subclass 7. Compounds wherein both rings which share a spiro atom contain at least two oxygens.

(1) Note. An example of a compound provide for herein is:



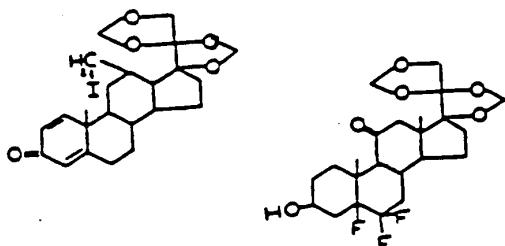
- 13 This subclass is indented under subclass 12. Compounds in which nitrogen, sulfur, cyano or -C(=X)-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly to the cyclopentano-hydrophenanthrene ring system.

(1) Note. Examples of compounds provided for herein are:



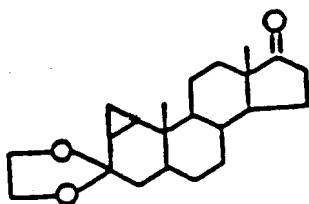
- 14 This subclass is indented under subclass 12. Compounds in which halogen is attached directly or indirectly to the cyclopentano-hydrophenanthrene ring system by acyclic nonionic bonding.

- (1) Note. Examples of compounds provided for herein are:



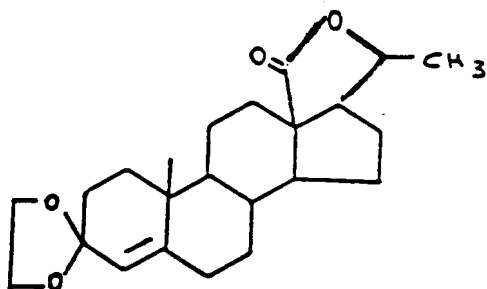
- 15** This subclass is indented under subclass 6. Compounds wherein the cyclopentano-hydrophenanthrene ring system is part of a polycyclo ring system having at least five cycles.

- (1) Note. An example of a compound provided for herein is:



- 16** This subclass is indented under subclass 15. Compounds in which a hetero ring is one of the cycles of the polycyclo ring system.

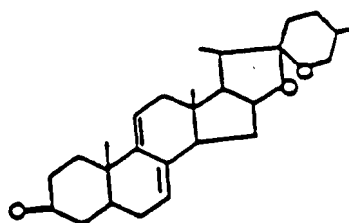
- (1) Note. An example of a compound provided for herein is:



- 17** This subclass is indented under subclass 16. Compounds wherein the hetero ring is five-membered, consisting of one oxygen and four

carbons, and shares the spiro atom with a six-membered hetero ring which contains oxygen.

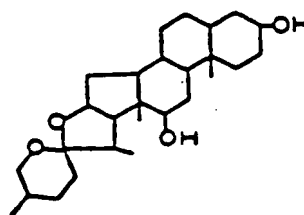
- (1) Note. An example of a compound provided for herein is:



- 18** This subclass is indented under subclass 17. Processes wherein the cyclopentano-hydrophenanthrene containing compound is separated from impurities or from the reaction medium.

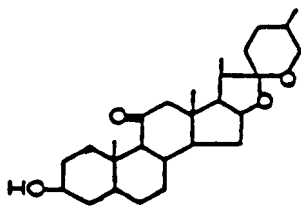
- 19** This subclass is indented under subclass 17. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly at the 12-position of the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is



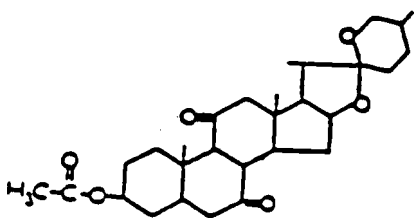
- 20** This subclass is indented under subclass 17. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly at the 11-position of the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is



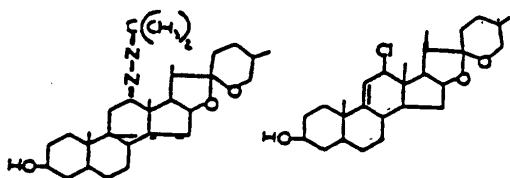
- 21 This subclass is indented under subclass 20. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly at the 7-position of the cyclopentano-hydrophenanthrene ring system.

(1) Note. An example of a compound provided for herein is:



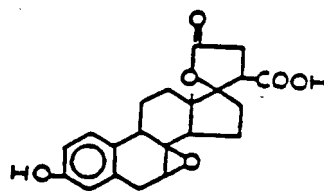
- 22 This subclass is indented under subclass 17. Compounds wherein halogen, cyano, nitrogen or sulfur is bonded directly to the cyclopentano-hydrophenanthrene ring system.

(1) Note. Examples of compounds provided for herein are:



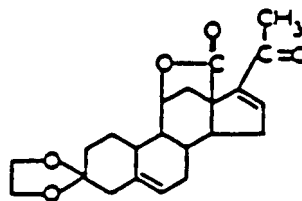
- 23 This subclass is indented under subclass 16. Compounds in which the 17-position carbon of the cyclopentano-hydrophenanthrene ring system is the spiro atom.

(1) Note. An example of a compound provided for herein is:



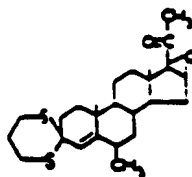
- 24 This subclass is indented under subclass 16. Compounds in which the hetero ring shares the 11, 12, 13-positions of the cyclopentano-hydrophenanthrene ring system (i.e., C-ring bridge).

(1) Note. An example of a compound provided for herein is:



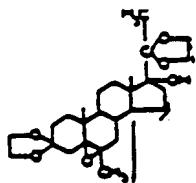
- 25 This subclass is indented under subclass 16. Compounds in which the hetero ring is three-membered consisting of one oxygen and two carbons.

(1) Note. An example of a compound provided for herein is:



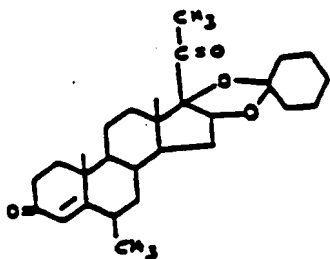
- 26 This subclass is indented under subclass 25. Compounds wherein the three-membered hetero ring shares the 5, 6-position of the cyclopentano-hydrophenanthrene ring system (i.e., ortho-fused to the B-ring).

(1) Note. An example of a compound provided for herein is:



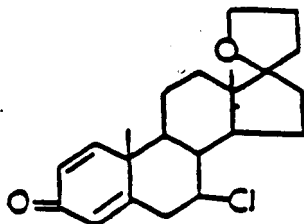
- 27 This subclass is indented under subclass 16. Compounds wherein the hetero ring contains two chalcogens (i.e., oxygen, sulfur, selenium or tellurium) which are bonded directly at the 16- and 17-positions of the cyclopentanohydrophenanthrene ring system (i.e., orth-fused to the D-ring).

(1) Note. An example of a compound provided for herein is:



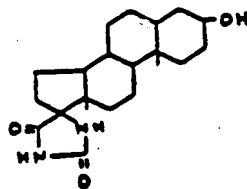
- 28 This subclass is indented under subclass 6. Compounds in which the cyclopentanohydrophenanthrene ring system shares a spiro atom with a hetero ring.

(1) Note. an example of a compound provided for herein is:



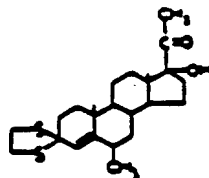
- 29 This subclass is indented under subclass 28. Compounds in which the spiro hetero ring contains nitrogen.

(1) Note. An example of a compound provided for herein is:



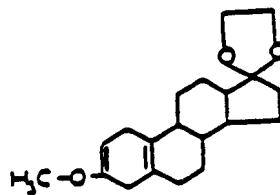
- 30 This subclass is indented under subclass 28. Compounds in which the spiro hetero ring contains sulfur.

(1) Note. An example of a compound provided for herein is:



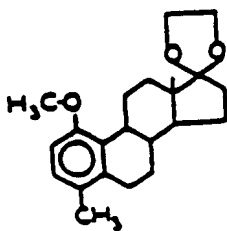
- 31 This subclass is indented under subclass 28. Compounds in which the spiro hetero ring contains at least two oxygens.

(1) Note. An example of a compound provided for herein is:



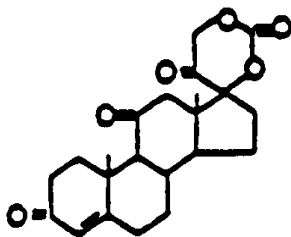
- 32 This subclass is indented under subclass 31. Compounds in which the A ring of the cyclopentanohydrophenanthrene ring system contains three alternating double bonds (i.e., is a benzene ring).

- (1) Note. An example of a compound provided for herein is:



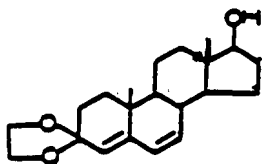
- 33 This subclass is indented under subclass 31. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the spiro hetero ring.

- (1) Note. An example of a compound provided for herein is:



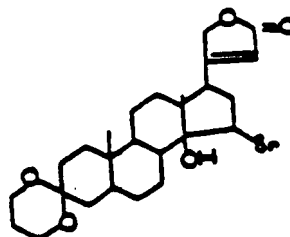
- 34 This subclass is indented under subclass 31. Compounds in which the spiro atom is the 3-position of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



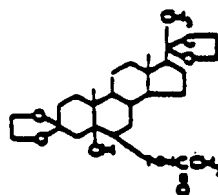
- 35 This subclass is indented under subclass 34. Compounds in which halogen is bonded directly to the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



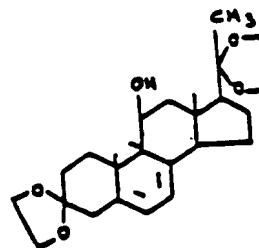
- 36 This subclass is indented under subclass 34. Compounds in which nitrogen is attached directly or indirectly to the cyclopentanohydrophenanthrene ring system by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



- 37 This subclass is indented under subclass 34. Compounds which contain at least two cyclic ketal rings.

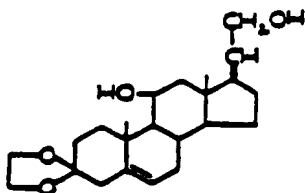
- (1) Note. An example of a compound provided for herein is:



- 38 This subclass is indented under subclass 34. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded

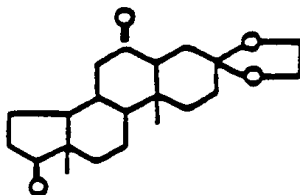
directly at the 11-position of the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



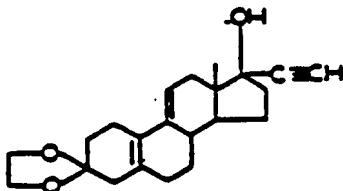
- 39 This subclass is indented under subclass 34. Compounds wherein there are no double bonds between any ring members of the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



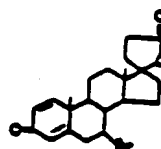
- 40 This subclass is indented under subclass 34. Compounds in which a carbon chain having carbon-to-carbon unsaturation is bonded directly at the 17-position of the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



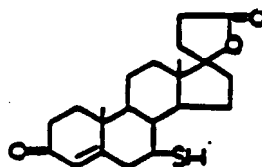
- 41 This subclass is indented under subclass 28. Compounds in which -C-O-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is part of the spiro hetero ring.

- (1) Note. An example of a compound provided for herein is:



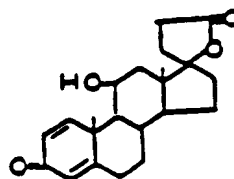
- 42 This subclass is indented under subclass 41. Compounds in which sulfur is bonded directly to the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



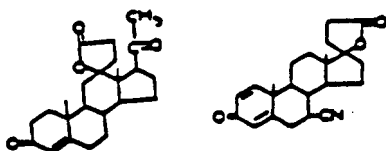
- 43 This subclass is indented under subclass 41. Compounds in which chalcogen (i.e., oxygen, sulfur selenium or tellurium) is bonded directly at the 11-position of the cyclopentano-hydrophenanthrene ring system.

- (1) Note. An example of compound provided for herein is:



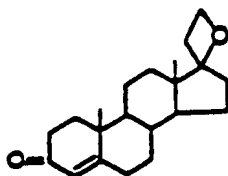
- 44** This subclass is indented under subclass 41. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium), halogen or nitrogen is attached indirectly to the cyclopentano-hydrophenanthrene ring system by acyclic nonionic bonding.

(1) Note. Examples of compounds provided for herein are:



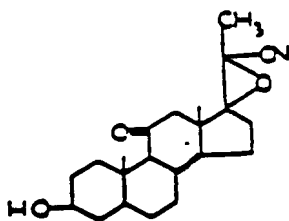
- 45** This subclass is indented under subclass 28. Compounds in which the spiro hetero ring is four-membered consisting of one oxygen and three carbons.

(1) Note. An example of a compound provided for herein is:



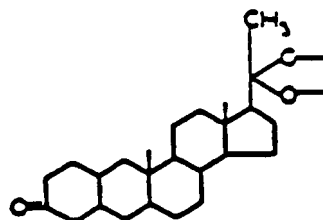
- 46** This subclass is indented under subclass 28. Compounds wherein the spiro hetero ring is three-membered consisting of one oxygen and two carbons.

(1) Note. An example of a compound provided for herein is:



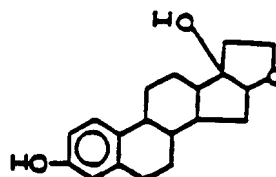
- 47** This subclass is indented under subclass 2. Compounds in which the cyclopentano-hydrophenanthrene ring system is part of a polycyclo ring system having at least five cycles.

(1) Note. An example of a compound provided for herein is



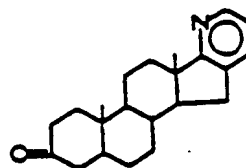
- 48** This subclass is indented under subclass 47. Compounds wherein a hetero ring is one of the cycles of the polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



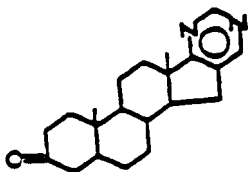
- 49** This subclass is indented under subclass 48. Compounds in which the hetero ring contains nitrogen.

(1) Note. An example of a compound provided for herein is:



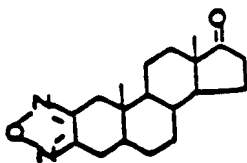
- 50** This subclass is indented under subclass 49. Compounds in which the hetero ring contains at least two nitrogens.

- (1) Note. An example of a compound provided for herein is:



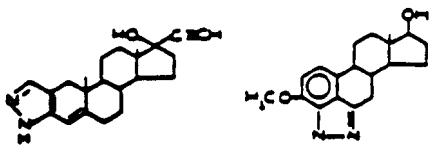
- 51** This subclass is indented under subclass 50. Compounds in which the hetero ring is five-membered.

- (1) Note. An example of a compound provided for herein is:



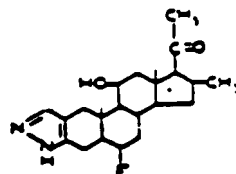
- 52** This subclass is indented under subclass 51. Compounds wherein the hetero ring consists of two nitrogens and three carbons and is ortho-fused to the A ring.

- (1) Note. Examples of compounds provided for herein are:



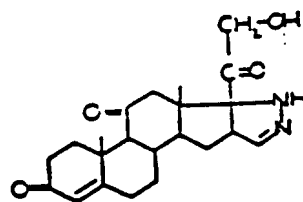
- 53** This subclass is indented under subclass 52. Compounds in which -C- wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly at the 17-position of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



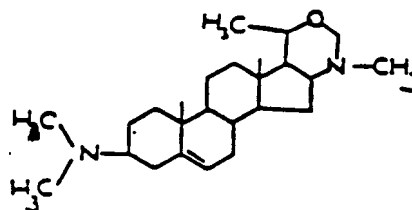
- 54** This subclass is indented under subclass 51. Compounds wherein the hetero ring consists of two nitrogens and three carbons and is ortho-fused to the D ring.

- (1) Note. An example of a compound provided for herein is:



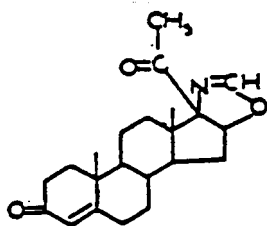
- 55** This subclass is indented under subclass 49. Compounds in which the hetero ring contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium) in addition to the nitrogen.

- (1) Note. An example of a compound provided for herein is:



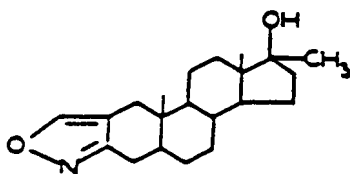
- 56** This subclass is indented under subclass 55. Compounds in which the hetero ring is five-membered.

- (1) Note. An example of a compound provided for herein is:



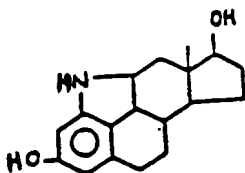
- 57 This subclass is indented under subclass 56. Compounds in which the hetero ring is ortho-fused to the A ring.

(1) Note. An example of a compound provided for herein is:



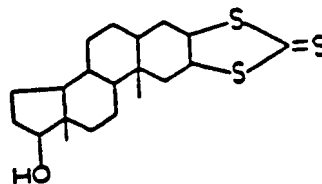
- 58 This subclass is indented under subclass 49. Compounds wherein the hetero ring is five-membered.

(1) Note. An example of a compound provided for herein is



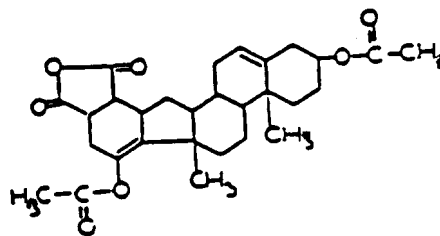
- 59 This subclass is indented under subclass 48. Compounds wherein the hetero ring contains sulfur.

(1) Note. An example of a compound provided for herein is:



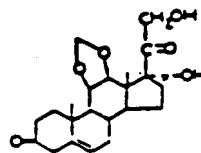
- 60 This subclass is indented under subclass 48. Compounds in which - - O - -, wherein X and Y may be the same or diverse chalogens (i.e., oxygen, sulfur, selenium or tellurium), is part of the hetero ring.

(1) Note. An example of a compound provided for herein is:



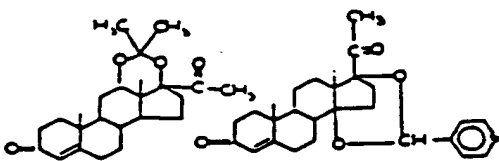
- 61 This subclass is indented under subclass 48. Compounds wherein the hetero ring contains at least two oxygens.

(1) Note. An example of a compound provided for herein is:



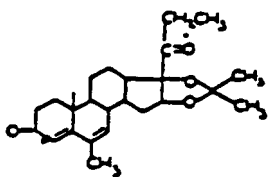
- 62 This subclass is indented under subclass 61. Compounds wherein (a) at least three ring members of one cyclo are ring members of an additional cyclo or (b) a ring carbon is a member of three of the cyclos in the polycyclo ring system (e.g., bridged or peri-fused, etc.).

(1) Note. Examples of compounds provided for herein are:



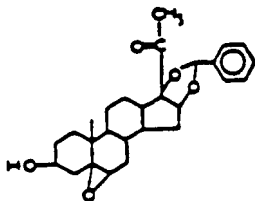
- 63** This subclass is indented under subclass 61. Compounds wherein the hetero ring is ortho-fused to the D ring.

(1) Note. An example of a compound provided for herein is:



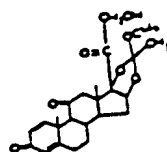
- 64** This subclass is indented under subclass 63. Compounds wherein the polycyclic ring system contains at least six cycles.

(1) Note. An example of a compound provided for herein is:



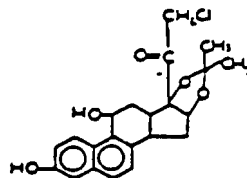
- 65** This subclass is indented under subclass 63. Compounds wherein nitrogen or acyclic chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the hetero ring.

(1) Note. An example of a compound provided for herein is:



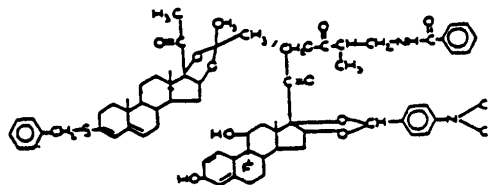
- 66** This subclass is indented under subclass 63. Compounds in which the A ring of the cyclopentanohydrophenanthrene ring system contains three alternating double bonds (i.e., is a benzene ring).

(1) Note. An example of a compound provided for herein is:



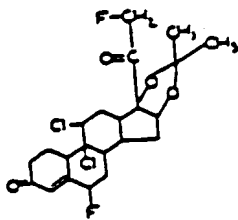
- 67** This subclass is indented under subclass 63. Compounds in which sulfur or nitrogen is attached directly or indirectly to the cyclopentanohydrophenanthrene ring system by acyclic nonionic bonding.

(1) Note. Examples of compounds provided for herein are:



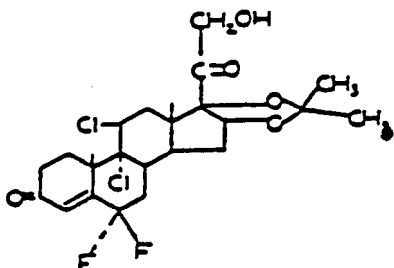
- 68** This subclass is indented under subclass 63. Compounds in which halogen is attached indirectly to cyclopentanohydrophenanthrene ring system by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



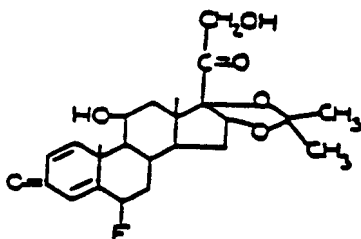
- 69 This subclass is indented under subclass 63. Compounds in which halogen is bonded directly to the cyclopentano-hydrophenanthrene ring system.

(1) Note. An example of a compound provided for herein is:



- 70 This subclass is indented under subclass 69. Compounds in which oxygen is bonded directly at the 11-position of the cyclopentano-hydrophenanthrene ring system.

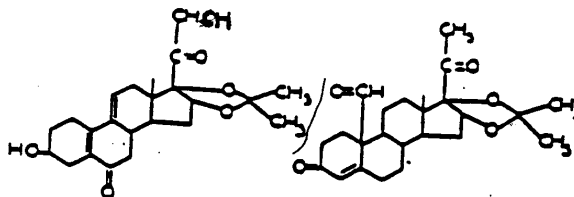
(1) Note. An example of a compound provided for herein is:



- 71 This subclass is indented under subclass 63. Compounds in which oxygen is either (a) attached directly to the B ring or (b) attached

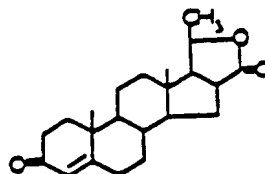
indirectly to the A or B ring by acyclic non-ionic bonding.

(1) Note. Examples of compounds provided for herein are:



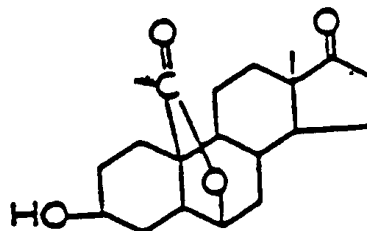
- 72 This subclass is indented under subclass 48. Compounds in which - - O -, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is part of the hetero ring (i.e., a lactone ring).

(1) Note. An example of a compound provided for herein is:



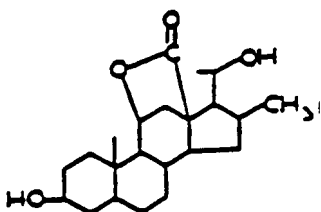
- 73 This subclass is indented under subclass 72. Compounds wherein the lactone ring shares at least three ring members with an additional cyclo of the polycyclo ring system (i.e., bridged).

(1) Note. An example of a compound provided for herein is:



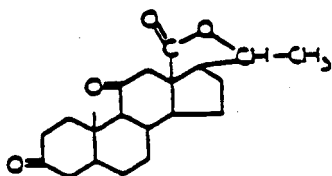
- 74 This subclass is indented under subclass 73. Compounds wherein the lactone ring shares the 11, 12, 13-positions of the cyclopentanohydrophenanthrene ring system (i.e., C ring bridge).

(1) Note. An example of a compound provided for herein is



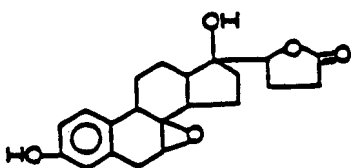
- 75 This subclass is indented under subclass 72. Compounds wherein the lactone ring shares a ring carbon with two other cyclos of the polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



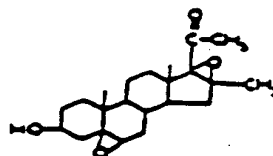
- 76 This subclass is indented under subclass 48. Compounds in which the hetero ring is three-membered consisting of one oxygen and two carbons.

(1) Note. An example of a compound provided for herein is:



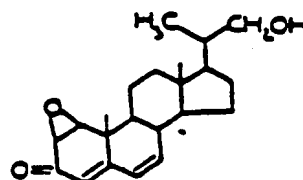
- 77 This subclass is indented under subclass 76. Compounds in which at least two oxirane rings are cyclos of the polycyclo ring system.

(1) Note. An example of a compound provided is:



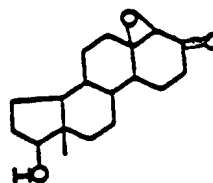
- 78 This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the A ring of the cyclopentanohydrophenanthrene ring system at the 1,2-positions.

(1) Note. An example of a compound provided for herein is:



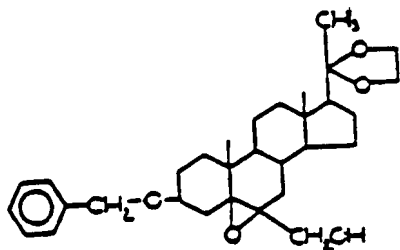
- 79 This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the A ring of the cyclopentanohydrophenanthrene ring system at the 4,5-positions.

(1) Note. An example of a compound provided for herein is:



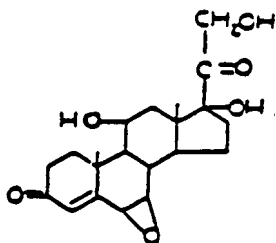
- 80** This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the B ring of the cyclopentanohydrophenanthrene ring system at the r6-positions.

(1) Note. An example of a compound provided for herein is:



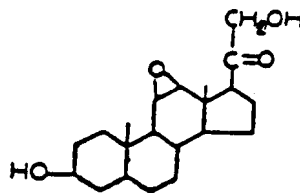
- 81** This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the B ring of the cyclopentanohydrophenanthrene ring system at the 6,7-positions.

(1) Note. An example of a compound provided for herein is:



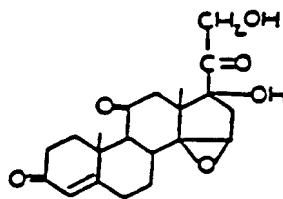
- 82** This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the C ring of the cyclopentanohydrophenanthrene ring system at the 11, 12-positions.

(1) Note. An example of a compound provided for herein is:



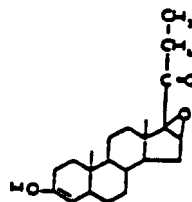
- 83** This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the D ring of the cyclopentanohydrophenanthrene ring system at the 14, 15-positions.

(1) Note. An example of a compound provided for herein is:



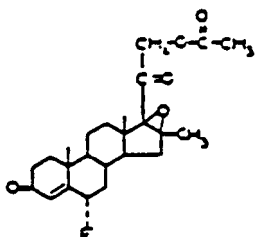
- 84** This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the D ring of the cyclopentanohydrophenanthrene ring system at the 16, 17-positions.

(1) Note. An example of a compound provided for herein is:



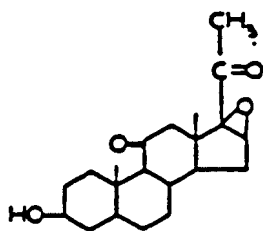
- 85** Compounds under subclass in 84 which halogen is bonded directly to the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided herein is:



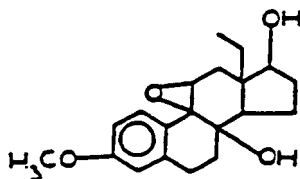
- 86** This subclass is indented under subclass 84. Compounds wherein the A ring is completely saturated; i.e., contains nor shares any double bonds between its ring members.

- (1) Note. An example of a compound provided for herein is:



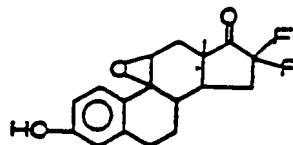
- 87** This subclass is indented under subclass 76. Compounds in which the hetero ring is ortho-fused to the C ring of the cyclopentanohydrophenanthrene ring system at the 9,11-positions.

- (1) Note. An example of a compound provided for herein is:



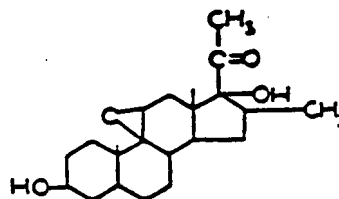
- 88** Compounds under subclass in 87 which halogen is bonded directly to the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



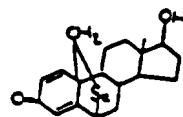
- 89** This subclass is indented under subclass 87. Compounds in which - C -, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly to the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



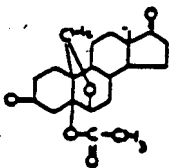
- 90** This subclass is indented under subclass 48. Compounds wherein the hetero ring shares at least three ring members with one other cyclo of the polycyclo ring system (i.e., bridged).

- (1) Note. An example of a compound provided for herein is:



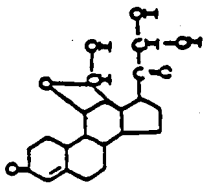
- 91** This subclass is indented under subclass 90. Compounds wherein the bridge consists of oxygen and carbon and links the 6 - and 10-positions of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



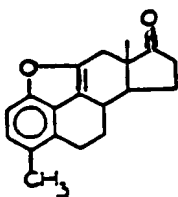
- 92** This subclass is indented under subclass 90. Compounds wherein the bridge consists of oxygen and carbon links the 11- and 13-positions of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



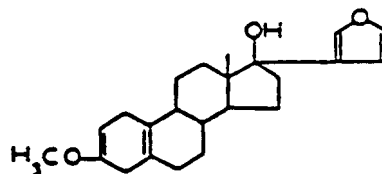
- 93** This subclass is indented under subclass 48. Compounds wherein the hetero ring shares a ring carbon with two other cyclos of the polycyclo ring system.

- (1) Note. An example of a compound provided for herein is:



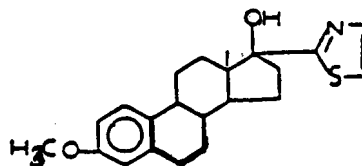
- 94** This subclass is indented under subclass 2. Compounds in which a hetero ring is attached directly to the cyclopentanohydrophenanthrene ring system by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



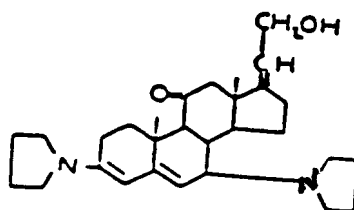
- 95** This subclass is indented under subclass 94. Compounds wherein the hetero ring contains nitrogen.

- (1) Note. An example of a compound provided for herein is:



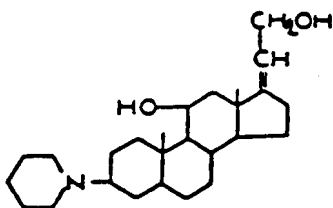
- 96** This subclass is indented under subclass 95. Compounds wherein at least two nitrogens containing hetero rings are bonded directly to the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



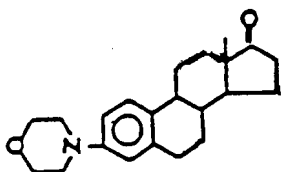
- 97** This subclass is indented under subclass 95. Compounds in which the hetero ring is bonded directly at the 3-position of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



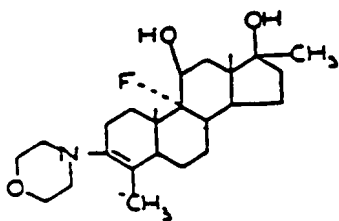
- 98** This subclass is indented under subclass 97. Compounds in which the A ring of the cyclopentanohydrophenanthrene ring system contains three alternating double bonds (i.e., is a benzene ring).

- (1) Note. An example of a compound provided for herein is:



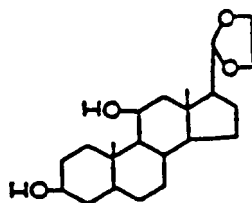
- 99** This subclass is indented under subclass 97. Compounds in which halogen is bonded directly to the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



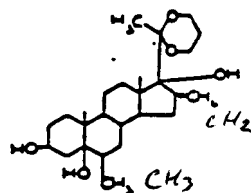
- 100** This subclass is indented under subclass 94. Compounds in which the hetero ring contains at least two chalogens (i.e., oxygen, sulfur, selenium or tellurium).

- (1) Note. An example of a compound provided for herein is:



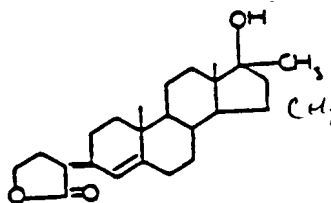
- 101** This subclass is indented under subclass 100. Compounds wherein both the hetero ring and acyclic chalcogen (i.e., oxygen, sulfur, selenium or tellurium) are bonded directly at the 17-position of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



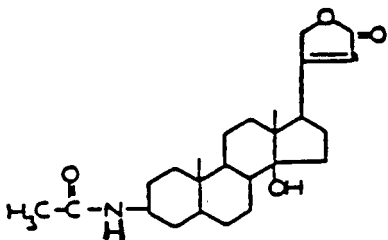
- 102** This subclass is indented under subclass 94. Compounds in which - O -, wherein is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is part of the hetero ring.

- (1) Note. An example of a compound provided for herein is:



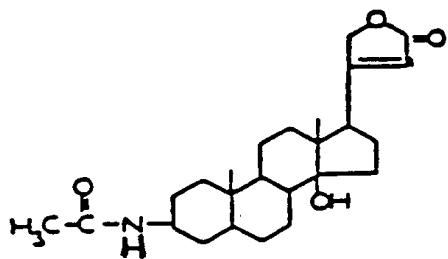
- 103** This subclass is indented under subclass 102. Compounds in which -CN, -X, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), or additional chalcogen is bonded directly to the hetero ring.

(1) Note. Examples of compounds provided for herein are:



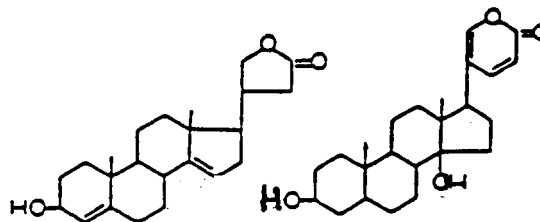
- 104** This subclass is indented under subclass 102. Compounds in which nitrogen or sulfur is attached directly or indirectly to the cyclopentanohydrophenanthrene ring system by non-ionic bonding.

(1) Note. An example of a compound provided for herein is:



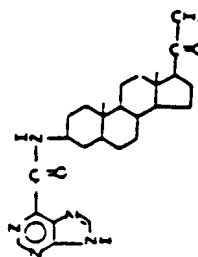
- 105** This subclass is indented under subclass 102. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly at the 14-position of the cyclopentanohydrophenanthrene ring system or the D ring of the cyclopentanohydrophenanthrene ring system contains a double bond.

(1) Note. Examples of compounds provided for herein are:



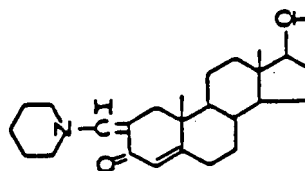
- 106** This subclass is indented under subclass 2. Compounds wherein nitrogen is attached directly to the cyclopentanohydrophenanthrene ring system by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



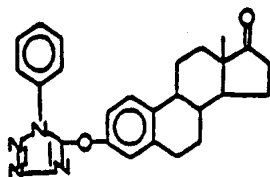
- 107** This subclass is indented under subclass 2. Compounds in which a nitrogen containing hetero ring is attached indirectly to the cyclopentanohydrophenanthrene ring system by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



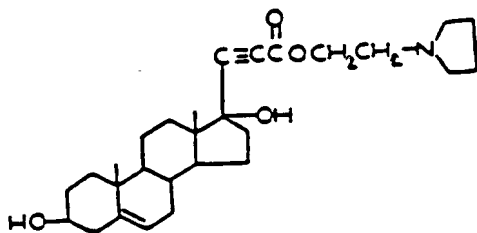
- 108** This subclass is indented under subclass 107. Compounds wherein the hetero ring is five-membered and contains at least two hetero atoms.

- (1) Note. An example of a compound provided for herein is:



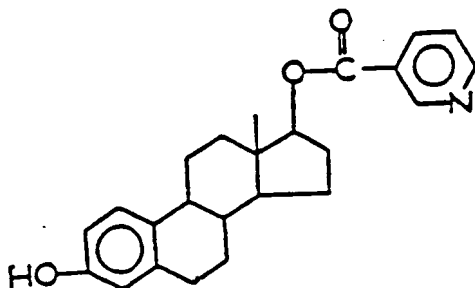
- 109** This subclass is indented under subclass 107. Compounds wherein the substituent at the 17-position of the cyclopentanohydrophenanthrene ring system contains the hetero ring.

- (1) Note. An example of a compound provided for herein is:



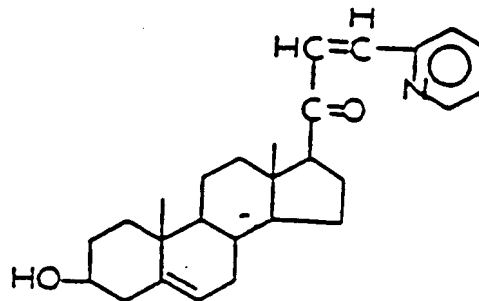
- 110** This subclass is indented under subclass 108. Compounds in which the hetero ring is bonded directly to a -C- group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

- (1) Note. An example of a compound provided for herein is:



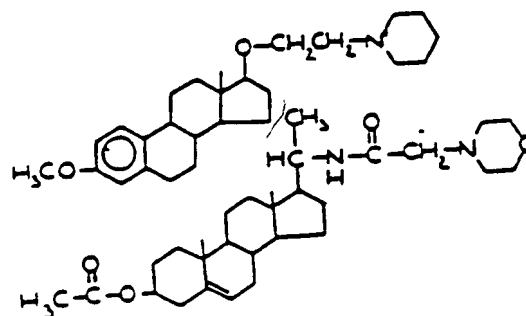
- 111** This subclass is indented under subclass 109. Compounds in which -C-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly at the 17-position of the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



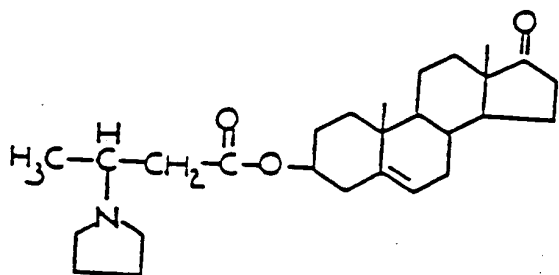
- 112** This subclass is indented under subclass 109. Compounds wherein nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is in the chain between the hetero ring and cyclopentanohydrophenanthrene ring system.

- (1) Note. Examples of compounds provided for herein are:



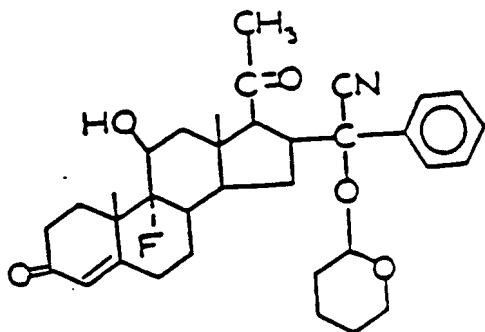
- 113** This subclass is indented under subclass 107. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is in the chain between the hetero ring and the cyclopentanohydrophenanthrene ring system.

- (1) Note. An example of a compound provided for herein is:



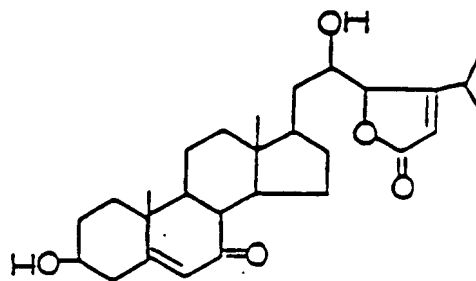
114 This subclass is indented under subclass 2. Compounds in which an oxygen containing hetero ring is attached indirectly to the cyclopentanohydrophenanthrene ring system by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



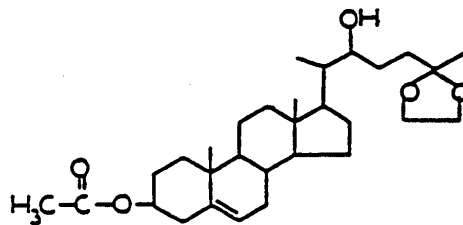
115 This subclass is indented under subclass 114. Compounds wherein - O -, wherein X is halogen (i.e., oxygen, sulfur, selenium or tellurium), is part of the hetero ring.

(1) Note. An example of a compound provided for herein is



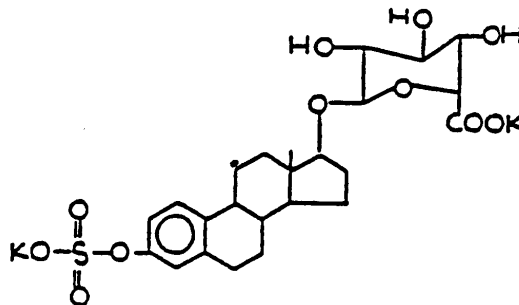
116 This subclass is indented under subclass 114. Compounds wherein the oxygen containing hetero ring contains an additional hetero atom.

(1) Note. An example of a compound provided for herein is:



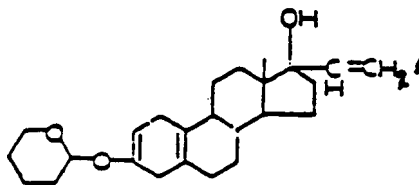
117 This subclass is indented under subclass 114. Compounds in which the A ring of the cyclopentanohydrophenanthrene ring system contains three alternating double bonds (i.e., is a benzene ring).

(1) Note. An example of a compound provided for herein is:



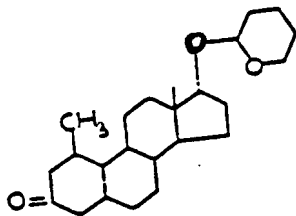
- 118** This subclass is indented under subclass 114. Compounds wherein the hetero ring is bonded directly to chalcogen (i.e., oxygen, sulfur, selenium or tellurium), which chalcogen is also bonded directly to the cyclopentano-phenanthrene ring system.

(1) Note. An example of a compound provided for herein is



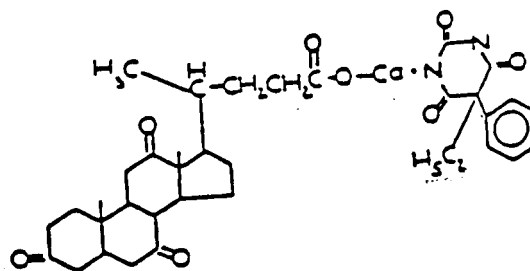
- 119** This subclass is indented under subclass 118. Compounds in which the chalcogen is bonded directly at the 17-position of the cyclopentano-hydrophenanthrene ring system.

(1) Note. An example of a compound provided for herein is:

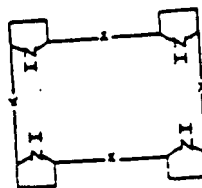


- 120** This subclass is indented under subclass 2. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to the cyclopentano-phenanthrene ring system by nonionic bonding.

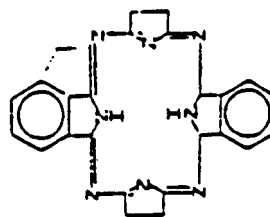
(1) Note. An example of a compound provided for herein is:



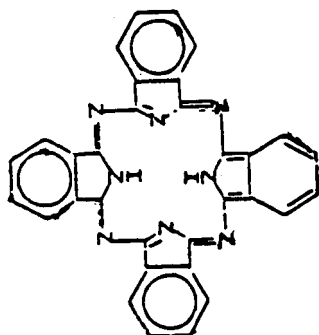
- 121** This subclass is indented under subclass 1. Compounds characterized by the following basic structure, illustrated below, which may contain double bonds between ring members and wherein X is nitrogen or carbon, at least one X is nitrogen.



(1) Note. An example of a compound provided for herein is:



- 122** This subclass is indented under subclass 121. Compounds which have the following basic structure (phthalocyanine ring system) wherein substitution may be made for hydrogen only:

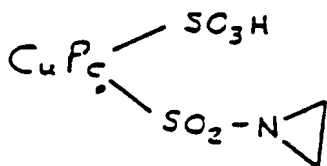


SEE OR SEARCH THIS CLASS, SUB-CLASS:

121, for hydrogenated phthalocyanines.

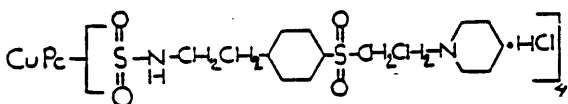
- 123** This subclass is indented under subclass 122. Compounds wherein an additional hetero ring is attached directly or indirectly to the phthalocyanine ring system by nonionic bonding.

(1) Note. Examples of compounds provided for herein are: poly (copper phthalocyanine (see structure below) wherein CuPc is a copper phthalocyanine radical.



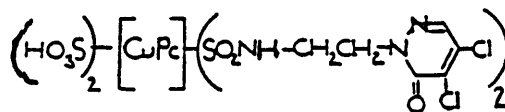
- 124** This subclass is indented under subclass 123. Compounds in which the hetero ring is six-membered and contains nitrogen as a ring member.

(1) Note. An example of a compound provided for herein is seen in the structure below, wherein CuPc is a copper phthalocyanine radical.



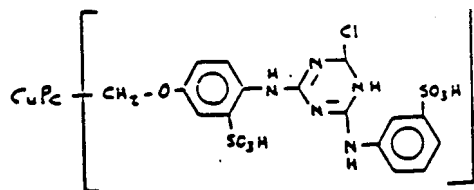
- 125** This subclass is indented under subclass 124. Compounds wherein the hetero ring contains at least two hetero atoms.

(1) Note. An example of a compound provided for herein is in the structure below, wherein CuPc is a copper phthalocyanine radical.



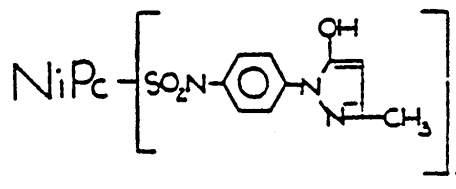
- 126** This subclass is indented under subclass 125. Compounds in which the hetero ring consists of three nitrogens and three carbons.

(1) Note. The structure below is an example of a compound provided for herein wherein CuPc is a copper phthalocyanine radical.



- 127** This subclass is indented under subclass 123. Compounds in which the hetero ring is five-membered and has plural hetero atoms, at least one of which is nitrogen.

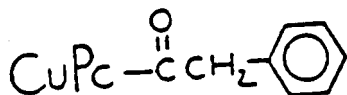
(1) Note. The structure below is an example of a compound provided for herein, wherein NiPc is a nickel phthalocyanine radical.



- 128** This subclass is indented under subclass 122. Compounds which contain boron, germanium, phosphorus or silicon.

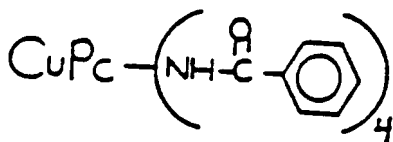
- 129** This subclass is indented under subclass 122. Compounds wherein a - - group, in which X is chalcogen (i.e., oxygen, sulfur, selenium, or tellurium), is bonded directly to a ring carbon of the phthalocyanine ring system.

- (1) Note. The structure below is an example of a compound provided for herein, wherein CuPc is a copper phthalocyanine radical.



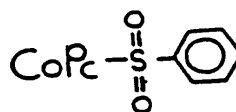
- 130** This subclass is indented under subclass 122. Compounds wherein a - - group, in which X is a chalcogen (i.e., oxygen, sulfur, selenium, or tellurium), is attached indirectly to a ring carbon of the phthalocyanine ring system by non-ionic bonding.

- (1) Note. The structure below is an example of a compound provided for herein, wherein CuPc is a copper phthalocyanine radical.



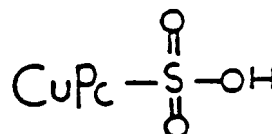
- 131** This subclass is indented under subclass 122. Compounds wherein - - is attached directly to a ring carbon of the phthalocyanine ring system.

- (1) Note. The structure below is an example of a compound provided herein, wherein CoPc is a cobalt phthalocyanine radical.:



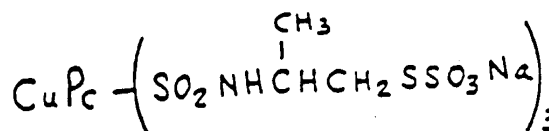
- 132** This subclass is indented under subclass 131. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium, or tellurium) is bonded directly to the - - group.

- (1) Note. The structure below is an example of a compound provided for herein, wherein CuPc is a copper phthalocyanine radical.



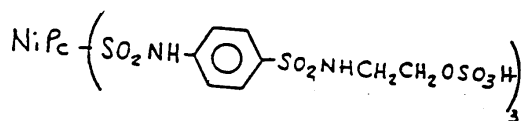
- 133** This subclass is indented under subclass 131. Compounds where nitrogen is bonded directly to the - - group.

- (1) Note. The structure below is an example of a compound provided for herein, wherein CuPc is a copper phthalocyanine radical.



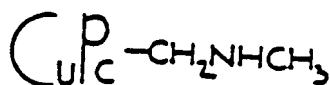
- 134** This subclass is indented under subclass 133. Compounds wherein the sulfonyl containing substituent contains an additional nitrogen atom.

- (1) Note. The structure below is an example of a compound provided for herein, wherein NiPc is a nickel phthalocyanine radical.



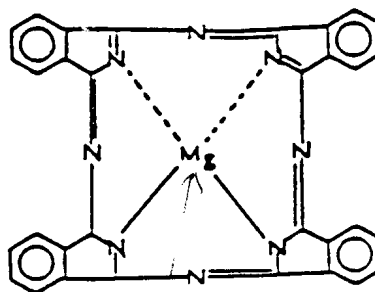
- 135** This subclass is indented under subclass 122. Compounds wherein nitrogen is attached indirectly to ring carbon of the phthalocyanine ring system by acyclic nonionic bonding.

- (1) Note. The structure below is an example of a compound provided for herein, wherein CuPc is a copper phthalocyanine radical.

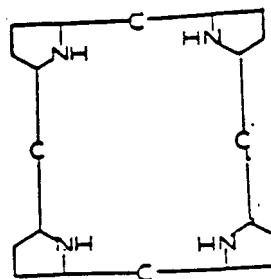


- 136** This subclass is indented under subclass 122. Compounds wherein halogen (i.e., fluorine, chlorine, bromine, iodine, or astatine) is bonded directly ring carbon of the phthalocyanine ring system.
- 137** This subclass is indented under subclass 136. Compounds wherein at least eight halogen (i.e., fluorine, chlorine, bromine, iodine, or astatine) atoms are bonded directly to ring carbons of the phthalocyanine ring system.
- 138** This subclass is indented under subclass 136. Processes for halogenating a ring carbon of the phthalocyanine ring system.
- 139** This subclass is indented under subclass 122. Compounds wherein the phthalocyanine ring system is bonded to a metal.

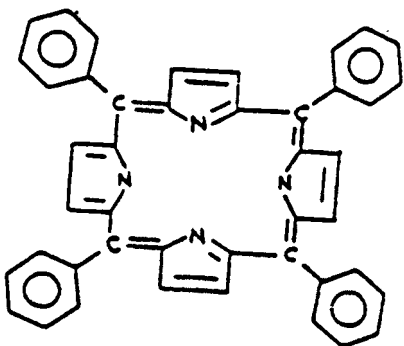
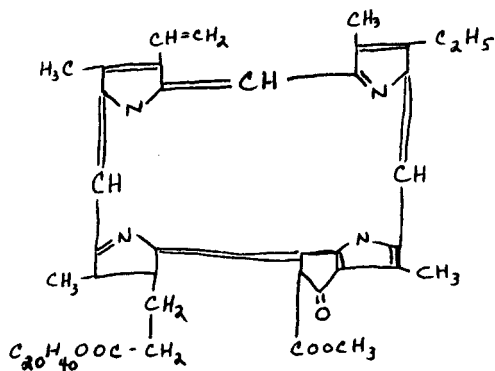
- (1) Note. An example of a compound provided for herein is: Magnesium phthalocyanine (below)



- 140** This subclass is indented under subclass 139. Compounds wherein the metal is aluminum or a metal having a specific gravity greater than 4.
- 141** This subclass is indented under subclass 140. Compounds which are in a specified crystalline form, or processes for milling heavy metal or aluminum containing phthalocyanines.
- (1) Note. The milling processes usually are for the purpose of obtaining certain crystalline forms.
- 142** This subclass is indented under subclass 140. Processes which include the formation of the phthalocyanine ring system.
- 143** This subclass is indented under subclass 142. Processes wherein the phthalocyanine ring system is prepared from a reactant which contains plural cyano groups.
- 144** This subclass is indented under subclass 142. Processes wherein the phthalocyanine ring system is prepared from a reactant which contains plural carbonyl groups.
- 145** This subclass is indented under subclass 1. Compounds which have the following basic structure, which may contain double bonds between ring members:

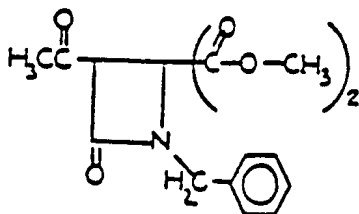


- (1) Note. Examples of compounds provided for herein are:



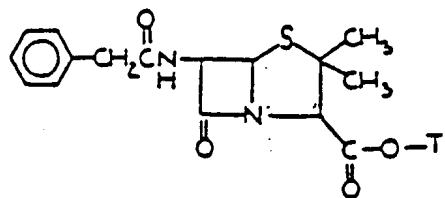
- 200** This subclass is indented under subclass 1. Compounds in which the hetero ring is four-membered, contains nitrogen and has chalcogen (i.e., oxygen, sulfur, selenium or tellurium) double bonded directly to a ring carbon which is adjacent to the ring nitrogen.

- (1) Note. An example of a compound provided for herein is:



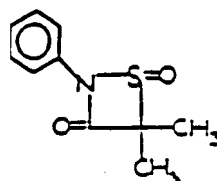
- 201** This subclass is indented under subclass 200. Compounds which include a metal having a specific gravity greater than four.

- (1) Note. Arsenic is considered a heavy metal.
- (2) Note. An example of a compound provided for herein is:



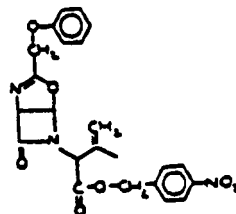
- 202** This subclass is indented under subclass 200. Compounds wherein the hetero ring contains at least two hetero atoms.

- (1) Note. An example of a compound provided for herein is:



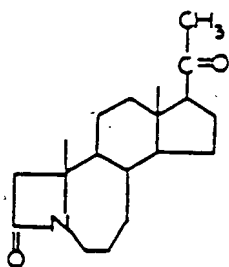
- 203** This subclass is indented under subclass 200. Compounds wherein the hetero ring is one of the cyclos of a polycyclo ring system.

- (1) Note. An example of a compound provided for herein is:



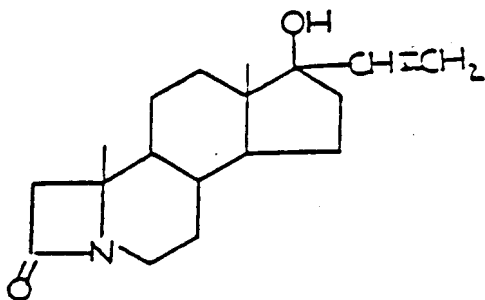
- 204** This subclass is indented under subclass 203. Compounds in which the ring nitrogen is shared by a ring containing at least seven members.

(1) Note. An example of a compound provided for herein is:



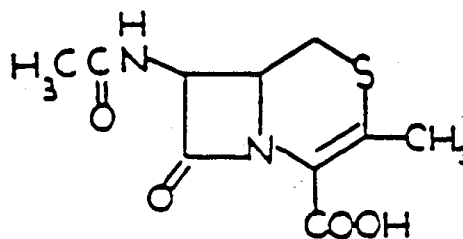
- 205** This subclass is indented under subclass 203. Compounds wherein the ring nitrogen is shared by a six-membered ring.

(1) Note. An example of a compound provided for herein is:

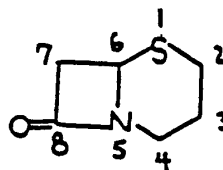


- 214** This subclass is indented under subclass 205. Compounds wherein the six-membered ring contains sulfur.

(1) Note. An example of a compound provided for herein is:



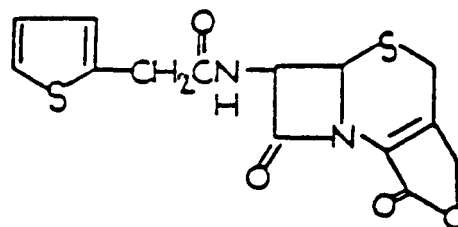
- 215** This subclass is indented under subclass 214. Compounds in which the polycyclo ring system has the following basic structure; which may contain double bonds between ring members:



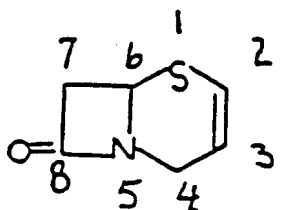
(1) Note. The Ring Index uses a different system for numbering the ring members. However, in the indents hereunder which refer to positions, the numbers shown in the definition are employed.

- 216** This subclass is indented under subclass 215. Compounds having a polycyclo ring system which contains at least three cyclos, two of which are the cepham or cephem ring system.

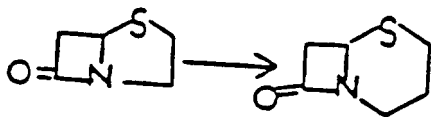
(1) Note. An example of a compound provided for herein is:



- 217** This subclass is indented under subclass 215. Compounds in which there is a double bond between the carbon atoms in the 2 - and 3 - positions of the ring system; i.e.,



- 218** This subclass is indented under subclass 215. Processes in which a cepham or cephem ring system is produced by the enlargement of the corresponding thiazole containing ring system: (i.e., the structure below) in which the rings may contain double bonds.



- 219** This subclass is indented under subclass 215. Compounds which have the following structure (Fig. 1) or salts thereof.

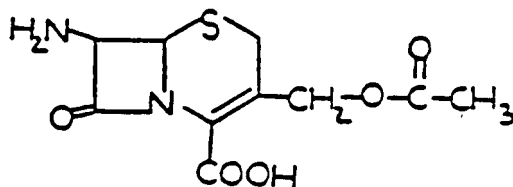
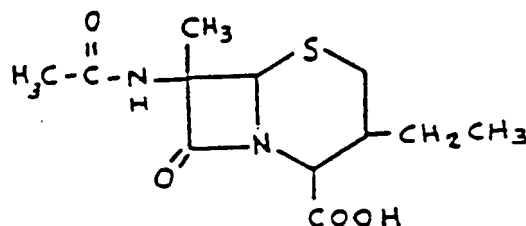


FIGURE 1.

- 220** This subclass is indented under subclass 215. Processes wherein the cepham or cephem containing compound is separated from impurities or from the reaction medium.
- 221** This subclass is indented under subclass 215. Compounds wherein both hydrogen atoms bonded to the carbon atom in the 7-position of

the cepham or cephem ring system have been replaced by substituents.

- (1) Note. An example of a compound provided for herein is:



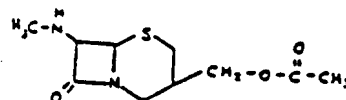
- 222** This subclass is indented under subclass 215. Compounds which contain an additional hetero ring.

SEE OR SEARCH THIS CLASS, SUBCLASS:

216, for compounds in which a heterocyclic ring is fused or bridged to the cepham or cephem ring system.

- 223** This subclass is indented under subclass 222. Compounds in which a substituent on either the 2 - or 4 - carbon atom of the cepham or cephem ring system contains or consists of a hetero ring.

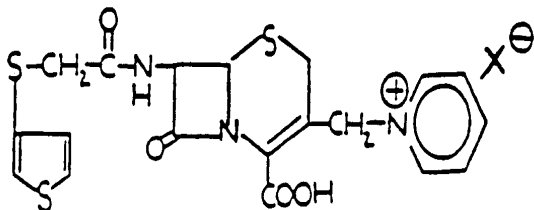
- (1) Note. An example of a compound provided for herein is:



- 224** This subclass is indented under subclass 222. Compounds in which a substituent on the 3-position substituent contains a pyridine ring (e.g., quinoline, thienopyridine, lutidines, etc.).

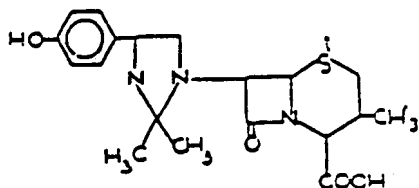
- 225** This subclass is indented under subclass 224. Compounds in which a substituent on the 7-position of the cepham or cephem ring system contains or consists of a hetero ring.

- (1) Note. The structure below is an example of a compound provided for herein wherein X is an anion.



- 226** This subclass is indented under subclass 22. Compounds which have sulfur or a sulfur containing group attached to the 3-position of the cepham or cephem ring system.
- 227** This subclass is indented under subclass 226. Compounds in which a substituent on the 7-position of the cepham or cephem ring system contains or consists of a hetero ring.
- 228** This subclass is indented under subclass 22. Compounds in which have -alkyl, -alkyl-OH, -alkyl-O-alkyl, or -alkyl-O--alkyl bonded directly at the 3-position of the cepham or cephem ring system.

- (1) Note. An example of the type of compound provided for herein is:



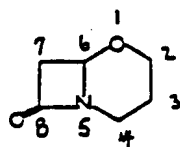
- 229** This subclass is indented under subclass 215. Compounds in which include sulfur bonded directly or indirectly to the cepham or cephem ring system.
- (1) Note. This subclass provides for salts containing sulfur, such as that formed by reacting Cephalosporin C with sodium thiosulfate, in addition to compounds in

which sulfur is attached by nonionic bonding.

SEE OR SEARCH THIS CLASS, SUBCLASS:

226, for compounds which contain a cepham or cephem ring system having a sulfur containing substituent and a hetero ring containing substituent.

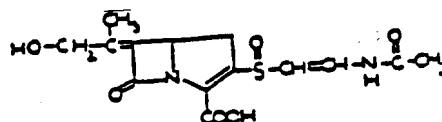
- 230** This subclass is indented under subclass 215. Compounds which have -alkyl, -alkyl-OH, -alkyl-O-alkyl, or -alkyl-O--alkyl bonded directly to the 3-position of the cepham or cephem ring system.
- 300** This subclass is indented under subclass 205. Compounds wherein the six-membered ring contains oxygen.
- 301** This subclass is indented under subclass 300. Compounds in which the polycyclo ring system has the following basic structure, which may contain double bonds between ring members:



- (1) Note. The above ring system may be referred to as 1-oxa-5-aza-bicyclo [4.2.0] octane, 5-oxa-1-aza-bicyclo [4.2.0] octane, etc. However, compounds having ring systems with this configuration are classified in this subclass regardless how they are named.

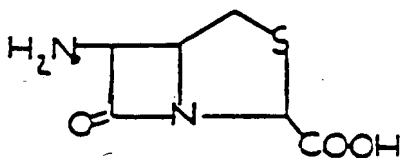
- 302** This subclass is indented under subclass 203. Compounds wherein the ring nitrogen is shared by a five-membered ring.

- (1) Note. An example of a compound provided for herein is:

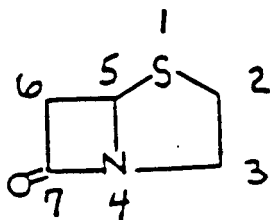


303 This subclass is indented under subclass 302. Compounds wherein the five-membered ring contains an additional hetero atom.

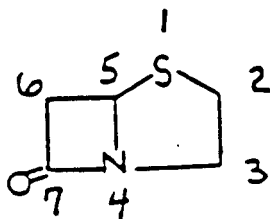
- (1) Note. An example of a compound provided for herein is:



304 This subclass is indented under subclass 303. Compounds in which the polycyclo ring system has the following basic structure, which may contain double bonds between ring members:



- (1) Note. The Ring Index uses a different system for numbering the ring members. However, in this and indented subclasses which refer to positions, the numbers shown in the definition are employed.
- (2) Note. This ring system is referred to as penam or penem (when unsaturated).
- (3) Note. An example of a compound provided for herein is:

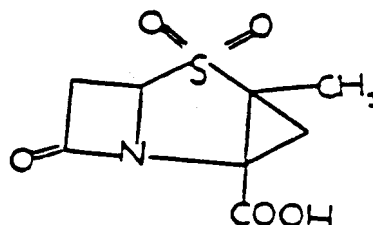


SEE OR SEARCH CLASS:

- 424, Drug, Bio-Affecting and Body Treating Compositions, subclass 114 and 405+ for a medical composition including a penicillin.
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 43+ for processes of producing penicillin by use of micro-organisms, tissue cell culture or enzymes.
- 514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 192+ for a medical composition including a penicillin.

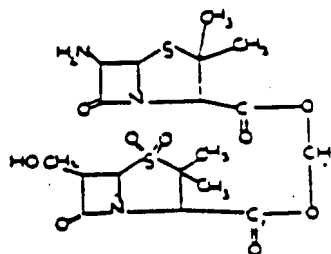
305 This subclass is indented under subclass 304. Compounds in which the bicyclo ring system is part of a polycyclo ring system containing at least three cycles.

- (1) Note. An example of a compound provided for herein is:



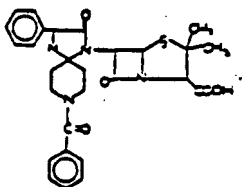
306 This subclass is indented under subclass 304. Compound in which at least two of the bicyclo ring systems are attached directly or indirectly to each other by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



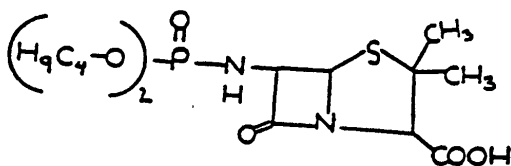
307 This subclass is indented under subclass 304. Compounds which contain a spiro ring system.

- (1) Note. An example of a compound provided for herein is



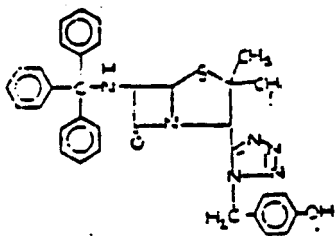
308 This subclass is indented under subclass 304. Compounds wherein the substituent at the 6-position of the bicyclo ring system contains phosphorus which is attached directly or indirectly to the ring system by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



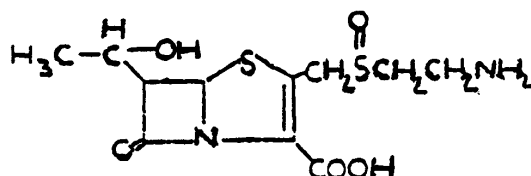
309 This subclass is indented under subclass 304. Compounds in which nitrogen containing hetero ring is attached directly at the 3-position of the bicyclo ring system.

- (1) Note. An example of a compound provided for herein is:

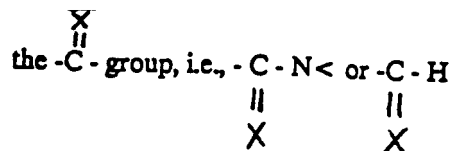


310 This subclass is indented under subclass 304. Compounds in which -C-, wherein X is chalo-gen (i.e., oxygen, sulfur, selenium or tellu-rium), is bonded directly at the 3-position of the bicyclo ring system.

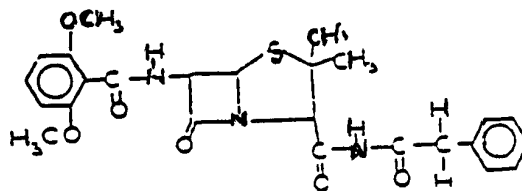
- (1) Note. An example of a compound provided for herein is



311 This subclass is indented under subclass 310. Compounds in which nitrogen or hydrogen is bonded directly to

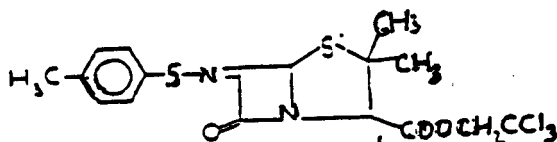


- (1) Note. An example of a compound provided for herein is:



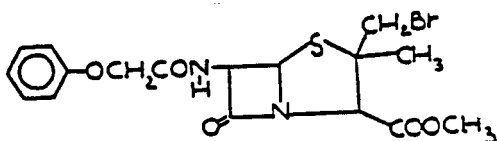
312 This subclass is indented under subclass 310. Compounds in which nitrogen is bonded directly at the 6-position of the bicyclo ring system.

- (1) Note. 6-APA and esters thereof are provided for in this subclass.
- (2) Note. An example of a compound provided for herein is:



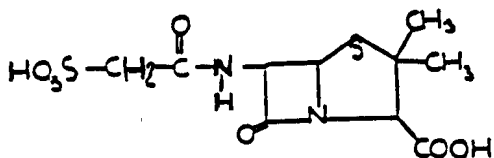
- 313** This subclass is indented under subclass 312. Compounds wherein the substituent at the 2-position of the bicyclo ring system contains chalcogen, nitrogen or halogen.

(1) Note. An example of a compound provided for herein is:



- 314** This subclass is indented under subclass 312. Compounds in which - -, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is single bonded directly to the nitrogen at the 6-position; i.e., - - N

- (1) Note. Penicillin K, F, dihydro, F, S, and O are provided for in this subclass.
- (2) Note. An example of a compound provided for herein is:



- 315** This subclass is indented under subclass 314. Processes which utilize penam containing compounds.
- 316** This subclass is indented under subclass 315. Processes for the formation of - - N, group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

- 317** This subclass is indented under subclass 316. Processes utilizing a boron, silicon or phosphorus containing reactant.

- 318** This subclass is indented under subclass 315. Processes whereby the 3-position - - X - group, wherein the X's may be the same or diverse chalcogens, is esterified.

- 319** This subclass is indented under subclass 315. Processes whereby the penam compound undergoes oxidation of sulfur, epimerization, de-esterification, reduction or alkoxyation at the 6-position.

- 320** This subclass is indented under subclass 315. Processes for the formation of solvate or anhydrous forms, or the formation of special crystalline forms.

- (1) Note. Included herein are those processes which effect (a) the formation of hydrate adducts and (b) the modification from the usual crystalline form of a penam compound to another crystalline form.

- 321** This subclass is indented under subclass 315. Processes whereby amine salts or penam compounds are converted into metal salts.

- 322** This subclass is indented under subclass 315. Process whereby the penam compound is separated from impurities or from the reaction mixture in an atmosphere which utilizes a solid adsorbant.

- 323** This subclass is indented under subclass 315. Process whereby a base salt of penam compound is formed.

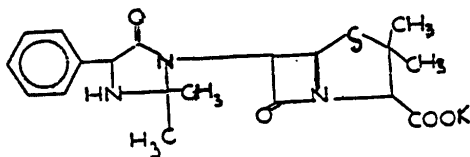
- (1) Note. The penam compound represents the acidic moiety in the salt formation; therefore, included herein are those processes directed to the preparation of penicillin salts, such as, the triethyl amine salt of penicillin G, the sodium salt of penicillin X, etc.

- 324** This subclass is indented under subclass 315. Processes wherein a solids extracted from solution.

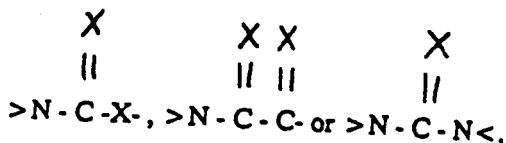
- (1) Note. Included herein are those processes wherein penicillin as recovered from aqueous liquors.

325 This subclass is indented under subclass 314. Compounds in which the nitrogen at the 6-position is part of a hetero ring.

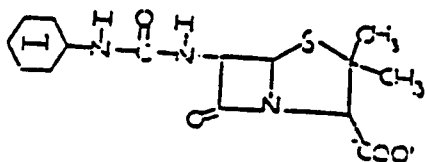
- (1) Note. Hetacillin and Hetaamoxicillin are provided for in this subclass.
- (2) Note. An example of a compound provided for herein is:



326 This subclass is indented under subclass 314. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium), - -, wherein X is chalcogen, or additional nitrogen is bonded directly to the - - group which is bonded directly to the 6-position nitrogen; i.e.,



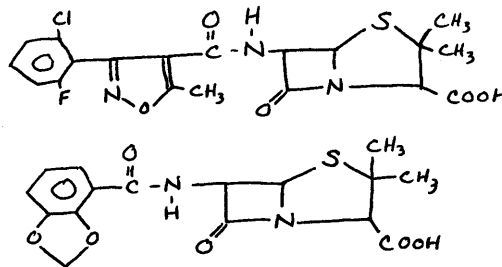
- (1) Note. An example of a compound provided for herein is:



327 This subclass is indented under subclass 314. Compounds wherein a hetero ring or a polycyclo ring system which contains a hetero ring as one of the cyclos is bonded directly to the - - group.

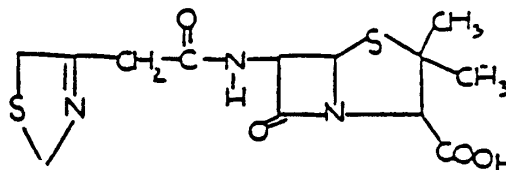
- (1) Note. Oxacillin, Floxacillin, Dicloxacillin, Cloxacillin and Flucloxacillin are provided for in this subclass.

- (2) Note. Examples of compounds provided for herein are:



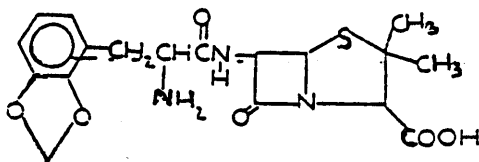
328 This subclass is indented under subclass 314. Compounds wherein a nitrogen containing hetero ring or a polycyclo ring system having a nitrogen containing ring as one of the cyclos is attached by carbon or an acyclic carbon chain to the - - group.

- (1) Note. An example of a compound provided for herein is:



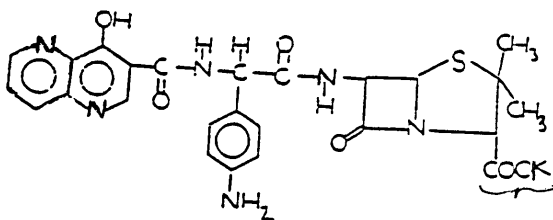
329 This subclass is indented under subclass 314. Compounds in which a polycyclo heterocyclic ring system is in the 6-position substituent.

- (1) Note. An example of a compound provided for herein is:



- 330** This subclass is indented under subclass 329. Compounds wherein the polycyclic ring system is attached directly to a - - NH - group, which group is between the polycyclic ring system and the penam ring system; X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) and substitution may be made for hydrogen only.

(1) Note. An example of a compound provided for herein is:



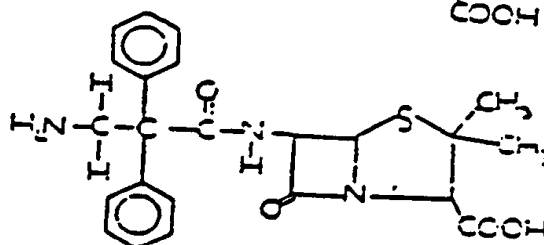
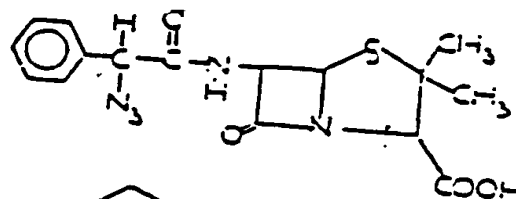
SEE OR SEARCH THIS CLASS, SUBCLASS:

333, for compounds which contain monocyclic hetero rings in the 6-position substituent.

- 331** This subclass is indented under subclass 314. Compounds in which acyclic nitrogen or azide is in the 6-position substituent attached indirectly to the - - group by acyclic nonionic bonding.

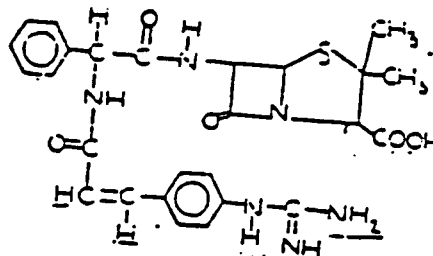
(1) Note. Metampicillin and Azidocillin are provided for in this subclass.

(2) Note. Examples of compounds provided for herein are:



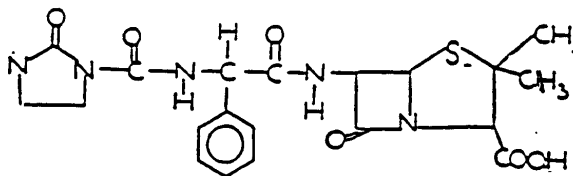
- 332** This subclass is indented under subclass 331. Compounds in which - C - wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is in the 6-position substituent bonded directly to the nitrogen.

(1) Note. An example of a compound provided for herein is:



- 333** This subclass is indented under subclass 332. Compounds in which a hetero ring is in the 6-position substituent bonded directly to the - - group.

(1) Note. An example of a compound provided for herein is:

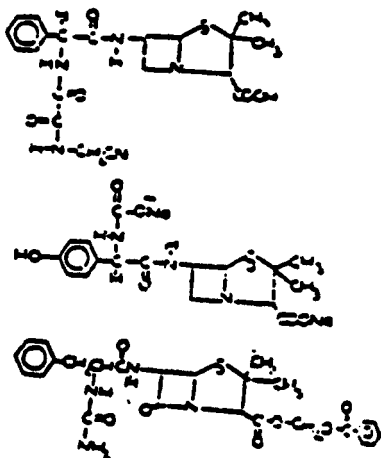


SEE OR SEARCH THIS CLASS, SUB-CLASS:

330, for compounds which contain polycyclic heterocyclic rings in the 6-position substituent.

- 334** This subclass is indented under subclass 332. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium), additional nitrogen or an additional - -, wherein X is chalcogen, is in the 6-position substituent bonded (i.e., - X - - -, - - - or - - - - indirect the to - - - which is bonded directly at the 6- position.)

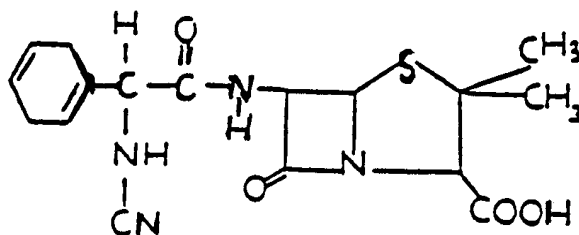
(1) Note. Examples of compounds provided for herein are:



- 335** This subclass is indented under subclass 331. Compounds wherein an additional acyclic nitrogen or acyclic chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is in the 6-position substituent attached indirectly to the - - group by nonionic bonding.

(1) Note. Amoxicillin is provided for in this subclass.

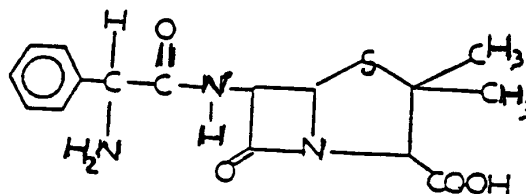
(2) Note. An example of a compound provided for herein is:



- 336** This subclass is indented under subclass 331. Compounds wherein the - C - group, an unsubstituted benzene ring and the acyclic nitrogen, as a - NH₂ group, are all bonded directly to the same carbon atom.

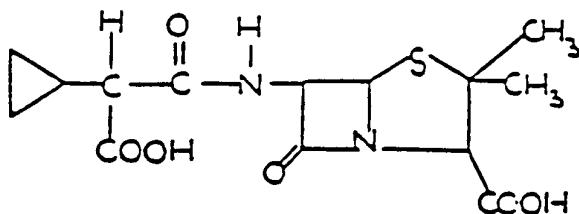
(1) Note. Ampicillin and Pivampicillin are provided for in this subclass.

(2) Note. An example of a compound provided for here is:



- 337** This subclass is indented under subclass 314. Compounds which contain a cycloaliphatic ring in the 6-position substituent.

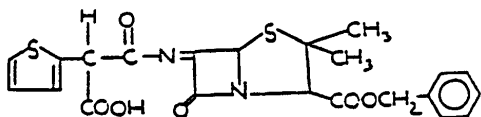
(1) Note. An example of a compound provided for herein is:



- 338** This subclass is indented under subclass 314. Compounds which contain a benzene ring or a hetero ring in the 6-position substituent.

(1) Note. Carbenicillin is provided for in this subclass.

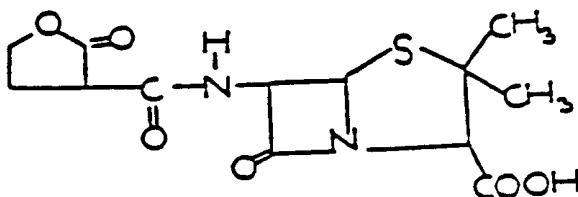
- (2) Note. An example of a compound provided for herein is:



- 339** This subclass is indented under subclass 338. Compounds wherein the ring is bonded directly to the - - group.

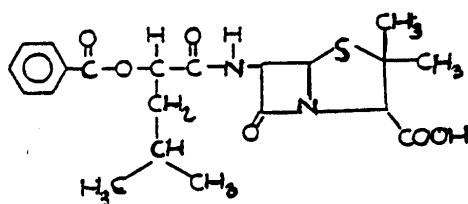
- (1) Note. Nafcillin and Methicillin are provided for in this subclass.

- (2) Note. An example of a compound provided for herein is:



- 340** This subclass is indented under subclass 338. Compounds wherein the chain between the ring and the - - group is a - - X - group, wherein the X's may be the same or diverse chalcogens, (i.e., oxygen, sulfur, selenium or tellurium).

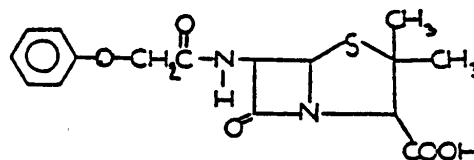
- (1) Note. An example of a compound provided for herein is



- 341** This subclass is indented under subclass 338. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is in the chain between the ring and the - - group.

- (1) Note. Penicillin V, Phenethicillin and Propicillin are provided for in this subclass.

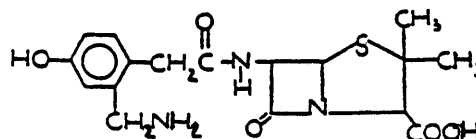
- (2) Note. An example of a compound provided for herein is:



- 342** This subclass is indented under subclass 338. Compounds wherein the ring is bonded directly to a hydrocarbyl chain which chain is bonded directly to the -- group.

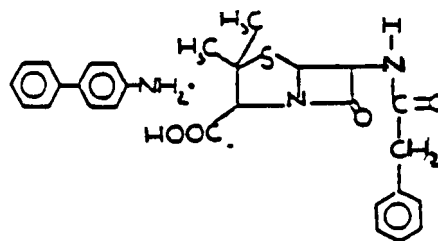
- (1) Note. Penicillin G, Penicillin X, and Penamecillin are provided for in this subclass.

- (2) Note. An example of a compound provided for herein is:



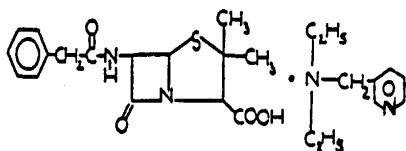
- 343** This subclass is indented under subclass 342. Compounds which are amine addition salts of the 3-position-COOH group.

- (1) Note. An example of a compound provided for herein is:



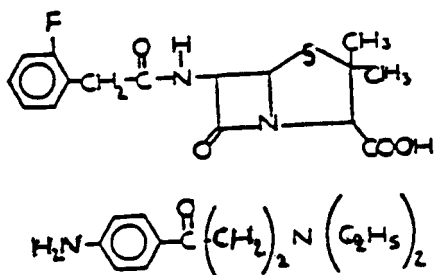
- 344** This subclass is indented under subclass 343. Compounds wherein a nitrogen containing hetero ring is in the cation; i.e., the penam compound is in the acid moiety, and the nitrogen containing hetero ring is in the amine moiety.

(1) Note. An example of a compound provided for herein is:



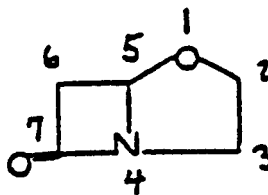
- 345** This subclass is indented under subclass 343. Compounds wherein at least two nitrogens are in the cation; the penam compound is in the anion.

(1) Note. An example of a compound provided for herein is:



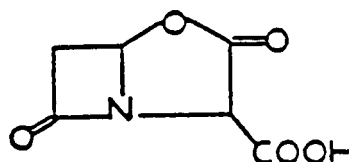
- 346** This subclass is indented under subclass 312. Processes for producing, purifying or recovering a compound which contains the 1-thia-4-aza-bicyclo[3.2.0]-heptane ring system (penam) having - - bonded directly at the 3-position and nitrogen bonded directly at the 6-position.

- 347** This subclass is indented under subclass 303. Compounds containing a bicyclo ring system having the following basic structure, which may contain double bonds between ring members:



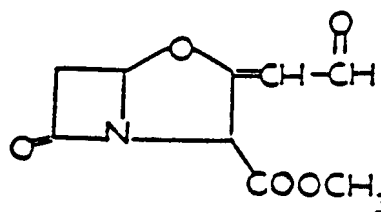
(1) Note. The above ring system may be referred to as 1-oxa-4-aza-bicyclo [3.2.0]heptane, 4-oxa-1-aza-bicyclo [3.2.0]heptane, etc. However, compounds having ring systems with this configuration are classified in this and indented subclasses regardless how they are named.

(2) Note. An example of a compound provided for herein is:



- 348** This subclass is indented under subclass 347. Compounds in which acyclic carbon is double bonded directly at the 2-position of the bicyclo ring system.

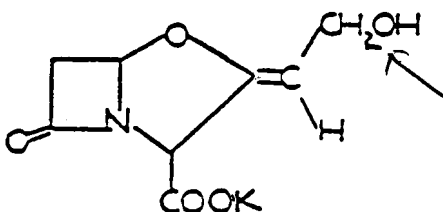
(1) Note. An example of a compound provided for herein is:



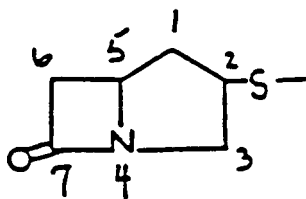
- 349** This subclass is indented under subclass 348. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached directly by a single bond to the carbon or to an

acyclic carbon chain which contains the carbon.

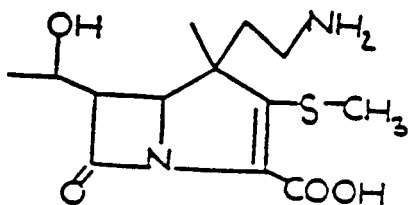
- (1) Note. An example of a compound provided for herein is:



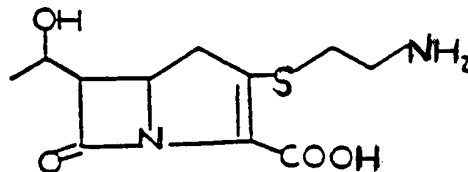
- 350** This subclass is indented under subclass 302. Compounds in which the ring system has the following basic structure, which may contain double bonds between ring members, and has sulfur bonded directly at the 2-position:



- (1) Note. The above ring system may be referred to as 4-aza-bicyclo[3.2.0]-heptane, 1-aza-bicyclo[3.2.0]-heptane, etc. However, compounds having ring systems with this configuration are classified in this and indented subclasses regardless how they are named.
- (2) Note. An example of a compound provided for herein is:

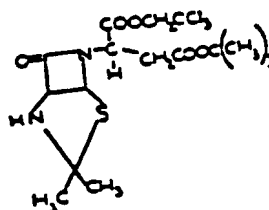


- 351** This subclass is indented under subclass 350. Compounds which have the following structure, or salts thereof:



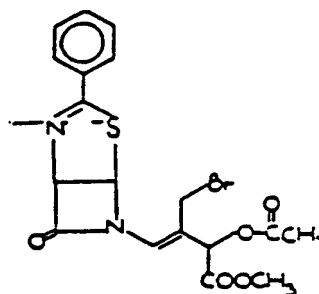
- 352** This subclass is indented under subclass 203. Compounds wherein one of the cyclos of the polycyclo ring system is a five-membered hetero ring consisting of one nitrogen, one sulfur and three carbons.

- (1) Note. An example of a compound provided for herein is:



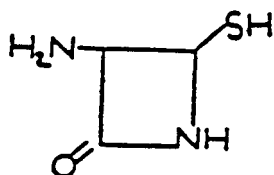
- 353** This subclass is indented under subclass 352. Compounds which contain a double bond between ring members of the five-membered hetero ring.

- (1) Note. An example of a compound provided for herein is:



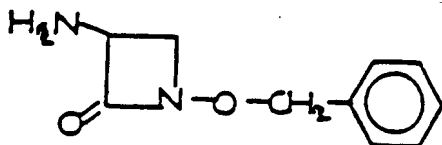
- 354** This subclass is indented under subclass 200. Compounds wherein additional chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the hetero ring.

(1) Note. An example of a compound provided herein is:



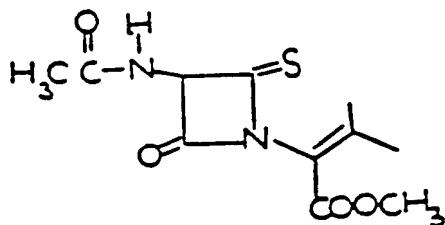
- 355** This subclass is indented under subclass 354. Compounds wherein the additional chalcogen is bonded directly to the ring nitrogen.

(1) Note. An example of a compound provided for herein is:



- 356** This subclass is indented under subclass 354. Compounds wherein the additional chalcogen is double bonded directly to the hetero ring.

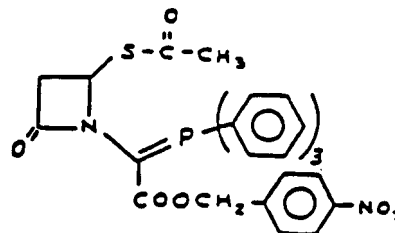
(1) Note. An example of a compound provided for herein is:



- 357** This subclass is indented under subclass 354. Compounds in which- - wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the additional chalcogen;

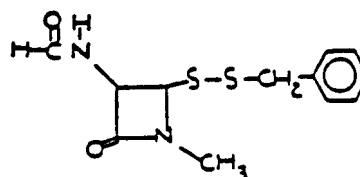
i.e., -X-- bonded directly to the four-membered hetero ring.

(1) Note. An example of a compound provided for herein is:



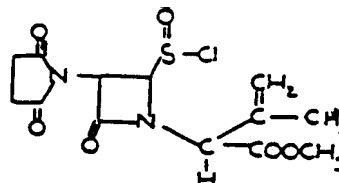
- 358** This subclass is indented under subclass 354. Compounds wherein the additional chalcogen is sulfur which also is bonded directly to chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:



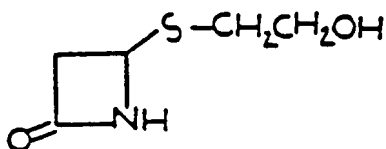
- 359** This subclass is indented under subclass 358. Compounds in which the sulfur is double bonded directly to the additional chalcogen.

(1) Note. An example of a compound provided for herein is:



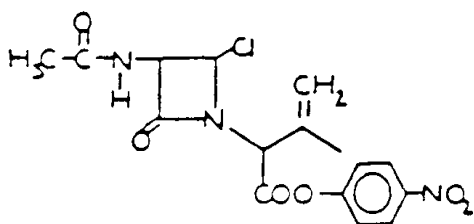
- 360** This subclass is indented under subclass 354. Compounds wherein an additional carbon is bonded directly to the addition chalcogen.

- (1) Note. An example of a compound provided for herein is:



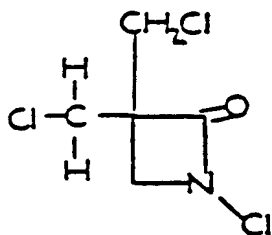
- 361** This subclass is indented under subclass 200. Compounds wherein halogen is attached directly at the 4-position of the hetero ring by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



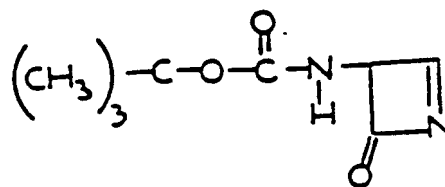
- 362** This subclass is indented under subclass 200. Compounds in which the 4-position of the hetero ring is either unsubstituted or substituted by alkyl only.

- (1) Note. An example of a compound provided for herein is:



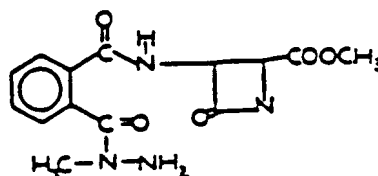
- 363** This subclass is indented under subclass 362. Compounds in which nitrogen is bonded directly at the 3-position of the hetero ring.

- (1) Note. An example of a compound provided for herein is:



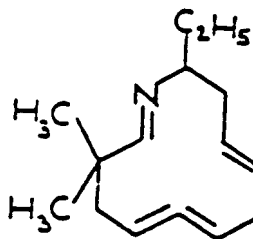
- 364** This subclass is indented under subclass 200. Compounds in which nitrogen is bonded directly at the 3-position of the hetero ring.

- (1) Note. An example of a compound provided for herein is:



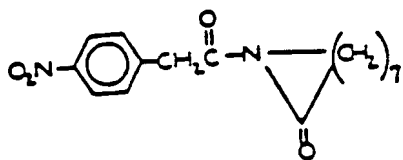
- 450** This subclass is indented under subclass 1. Compounds wherein the hetero ring contains at least eight members and has nitrogen and carbon as ring members.

- (1) Note. An example of a compound provided for herein is:



- 451** This subclass is indented under subclass 450. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is double bonded directly to a carbon of the hetero ring which is adjacent to the nitrogen.

- (1) Note. An example of a compound provided for herein is:

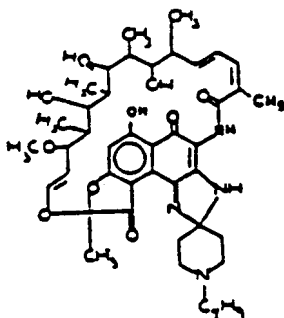


- 452** This subclass is indented under subclass 451. Compounds which include a metal having a specific gravity greater than four, aluminum, boron or silicon.

(1) Note. Arsenic is considered a metal for purposes of this subclass.

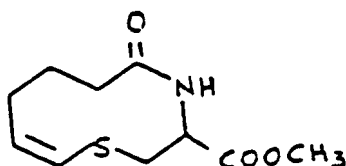
- 453** This subclass is indented under subclass 451. Compounds which include a spiro ring system.

(1) Note. An example of a compound provided for herein is:



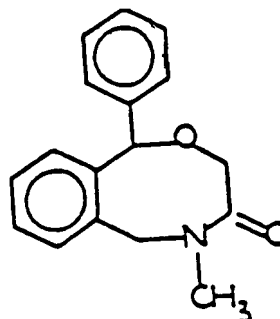
- 454** This subclass is indented under subclass 451. Compounds wherein the hetero ring contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:



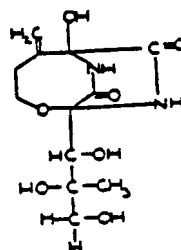
- 455** This subclass is indented under subclass 454. Compounds in which the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



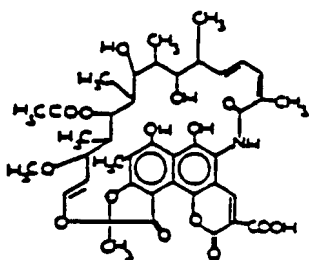
- 456** This subclass is indented under subclass 455. Compounds wherein (a) at least three members of one cyclo are members of an additional cyclo in the polycyclo ring system, or (b) one ring member is a member of three of the cyclos in the polycyclo ring system (e.g., bridged, peri-fused, etc.).

(1) Note. An example of a compound provided for herein is:



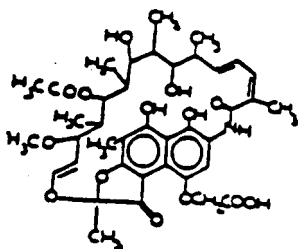
- 457** This subclass is indented under subclass 456. Compounds wherein the polycyclo ring system contains a five-membered cyclo which consists of four carbons and one oxygen.

(1) Note. An example of a compound provided for herein is:



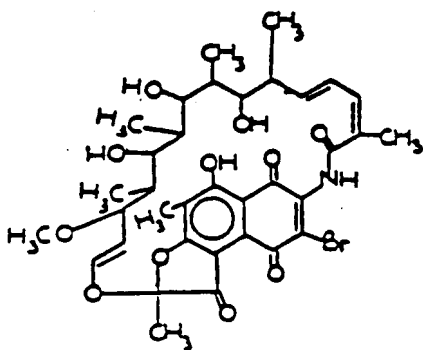
- 458** This subclass is indented under subclass 457. Compounds in which the polycyclo ring system consists of exactly four rings.

(1) Note. An example of a compound provided for herein is:



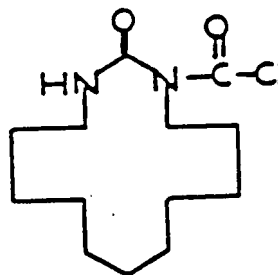
- 459** This subclass is indented under subclass 458. Compounds in which nitrogen, sulfur or halogen is attached directly to the tetracyclo ring system by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



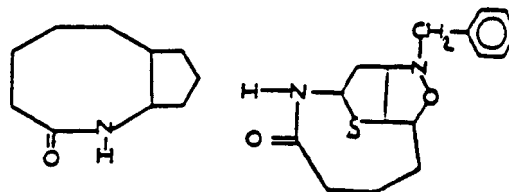
- 460** This subclass is indented under subclass 451. Compounds in which the hetero ring contains at least two nitrogens.

(1) Note. An example of a compound provided for herein is:



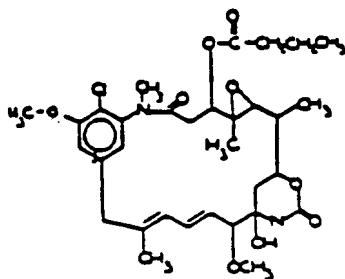
- 461** This subclass is indented under subclass 451. Compounds wherein the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. Examples of compounds provided for herein are:



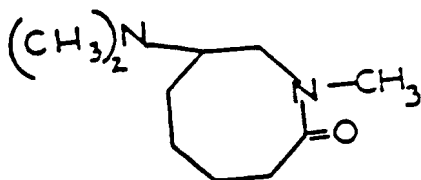
- 462** This subclass is indented under subclass 461. Compounds wherein one of the cyclos of the polycyclo ring system is three-membered consisting of one oxygen and two carbons.

(1) Note. An example of a compound provided for herein is:



- 463** This subclass is indented under subclass 451. Compounds wherein nitrogen or additional chalcogen is attached directly to the hetero ring by nonionic bonding.

(1) Note. An example of a compound provided for herein is:

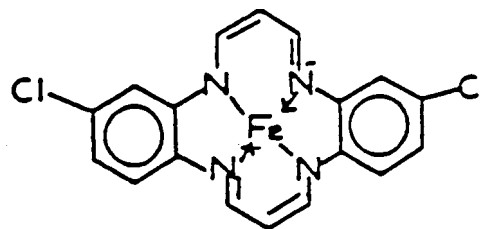


- 464** This subclass is indented under subclass 451. Processes which utilize oximes (=NOH), oxime salts (=NO-cation), hydroxylamines (-N-OH), hydroxylamine salts (-N-O-cation) or nitrosating agents to form the lactam ring.

- 465** This subclass is indented under subclass 450. Compounds which include aluminum or a metal having a specific gravity greater than four.

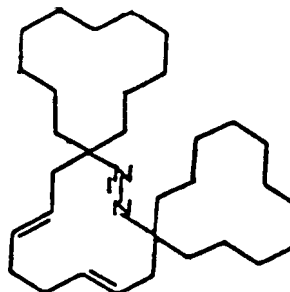
(1) Note. Arsenic is considered a metal for purposes of this subclass.

(2) Note. An example of a compound provided for herein is:



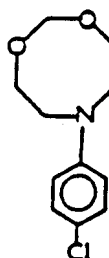
- 466** This subclass is indented under subclass 450. Compounds which include a spiro ring system.

(1) Note. An example of a compound provided for herein is:



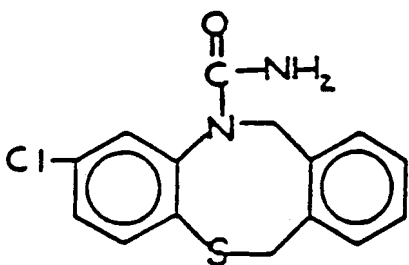
- 467** This subclass is indented under subclass 450. Compounds in which the hetero ring contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:



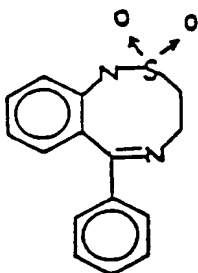
- 468** This subclass is indented under subclass 467. Compounds in which the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



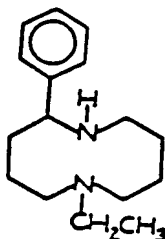
- 469** This subclass is indented under subclass 468. Compounds in which the hetero ring contains at least two nitrogens.

(1) Note. An example of a compound provided for herein is:



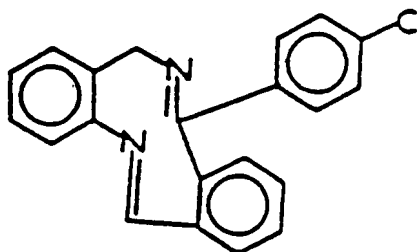
- 470** This subclass is indented under subclass 450. Compounds in which the hetero ring contains at least two nitrogens.

(1) Note. An example of a compound provided for herein is:



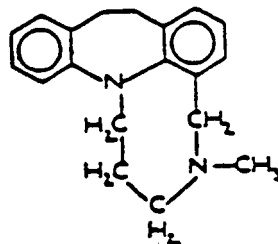
- 471** This subclass is indented under subclass 470. Compounds in which the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



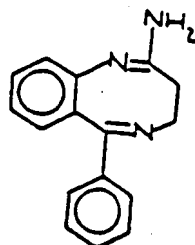
- 472** This subclass is indented under subclass 471. Compounds wherein (a) at least three members of one cyclo in the polycyclo ring system, or (b) one ring member is a member of three of the cyclos in the polycyclo ring system (e.g., bridged, perl-fused, etc.).

(1) Note. An example of a compound provided for herein is:



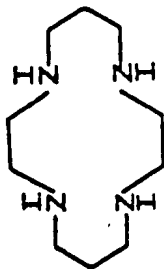
- 473** This subclass is indented under subclass 471. Compounds in which the polycyclo ring system consists of exactly two rings.

(1) Note. An example of a compound provided for herein is:



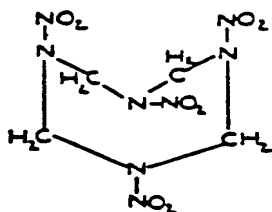
- 474** This subclass is indented under subclass 470. Compounds in which the hetero ring contains at least three nitrogens.

(1) Note. An example of a compound provided for herein is:



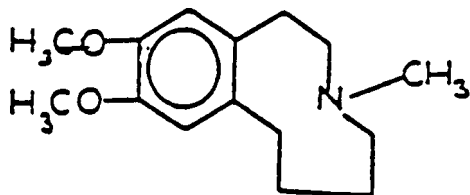
- 475** This subclass is indented under subclass 474. Compounds in which nitro (i.e., -NO₂) is bonded directly to a ring nitrogen of the hetero ring.

(1) Note. This subclass includes HMX (1,3,5,7-tetranitro-1,3,5,7-tetraazacyclooctane)



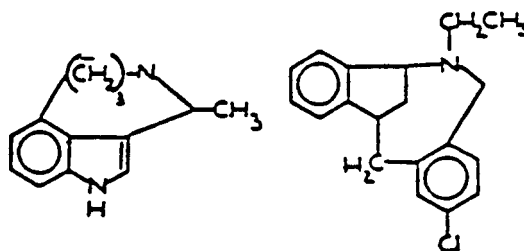
- 476** This subclass is indented under subclass 450. Compounds in which the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



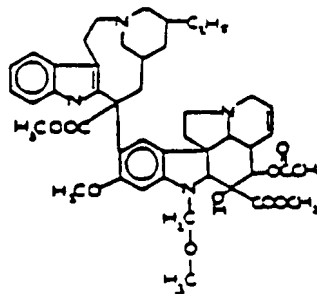
- 477** This subclass is indented under subclass 476. Compounds wherein (a) at least three members of one cyclo are members of an additional cyclo in the polycyclo ring system, or (b) one ring member is a member of three of the cyclos in the polycyclo ring system (e.g., bridged, peri-fused, etc.).

(1) Note. examples of compounds provided for herein are:



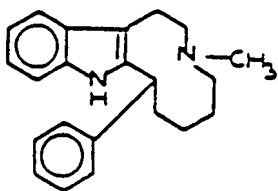
- 478** This subclass is indented under subclass 477. Compounds which contain an additional polycyclo ring system having at least two nitrogens.

(1) Note. An example of a compound provided for herein is:



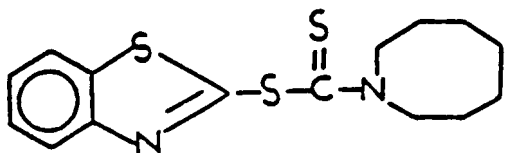
- 479** This subclass is indented under subclass 476. Compounds in which the polycyclo ring system consists of exactly three rings.

(1) Note. An example of a compound provided for herein is:



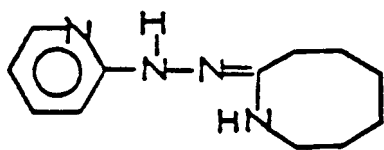
- 480** This subclass is indented under subclass 450. Compounds wherein an additional hetero ring is attached directly or indirectly to the hetero ring by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



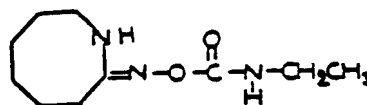
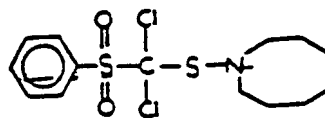
- 481** This subclass is indented under subclass 480. Compounds in which the additional hetero ring is six-membered and contains nitrogen.

(1) Note. An example of a compound provided for herein is:



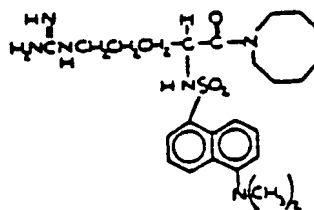
- 482** This subclass is indented under subclass 450. Compounds in which nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached directly to the hetero ring by nonionic bonding.

(1) Note. Examples of compounds provided for herein are:



- 483** This subclass is indented under subclass 450. Compounds in which at least two nitrogens are attached indirectly to the hetero ring by acyclic nonionic bonding.

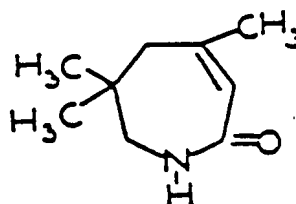
(1) Note. An example of a compound provided for herein is:



- 484** This subclass is indented under subclass 1. Compounds wherein the hetero ring contains seven members and has nitrogen and carbon as ring members.

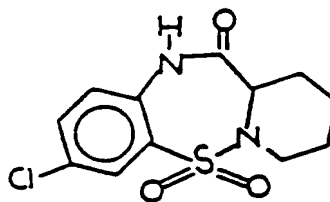
- 485** This subclass is indented under subclass 484. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is double bonded directly to one of the ring carbons of the hetero ring which is adjacent to the ring nitrogen.

(1) Note. An example of a compound provided for herein is:



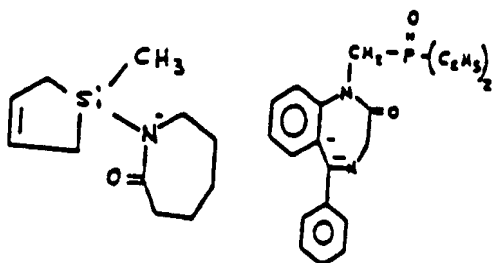
- 486** This subclass is indented under subclass 485. Compounds which contain aluminum or a metal having a specific gravity greater than four.

(1) Note. Arsenic is considered a metal for the purposes of this subclass.



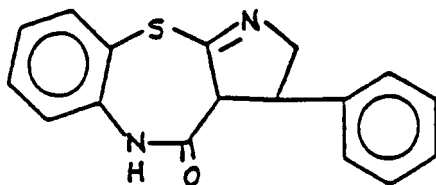
- 487** This subclass is indented under subclass 485. Compounds in which phosphorus or silicon is attached directly or indirectly to the hetero ring by nonionic bonding.

(1) Note. Examples of compounds provided for herein are:



- 488** This subclass is indented under subclass 485. Compounds in which the hetero ring contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:

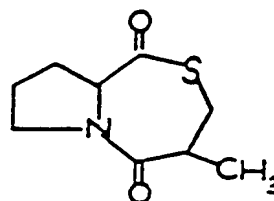


- 489** This subclass is indented under subclass 488. Compounds in which the hetero ring contains at least two nitrogens.

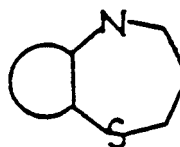
(1) Note. An example of a compound provided for herein is:

- 490** This subclass is indented under subclass 488. Compounds wherein the hetero ring is in a polycyclic ring system which contains exactly two cycles.

(1) Note. An example of a compound provided for herein is

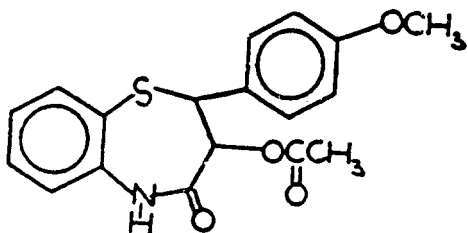


- 491** This subclass is indented under subclass 490. Compounds wherein the chalcogen and the nitrogen are in the 1,5-positions of the bicyclic ring system; i.e.,



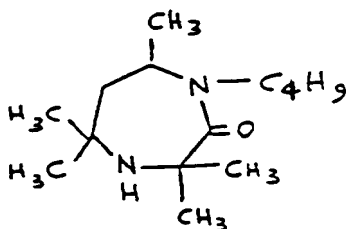
(1) Note. An example of a compound provided for herein is:

- (1) Note. An example of a compound provided for herein is:



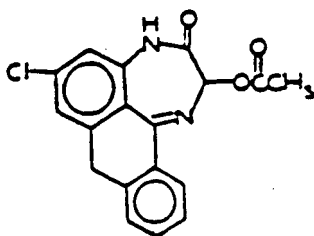
- 492** This subclass is indented under subclass 485. Compounds in which the hetero ring contains at least two nitrogens.

- (1) Note. An example of a compound provided for herein is:

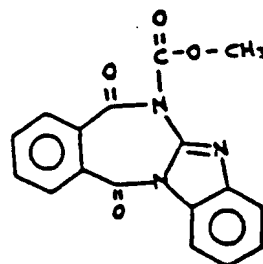


- 493** This subclass is indented under subclass 492. Compounds wherein the hetero ring is in a polycyclo ring system which contains exactly four cycles.

- (1) Note. An example of a compound provided for herein is:

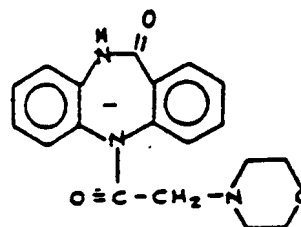


- 494** This subclass is indented under subclass 493. Compounds wherein a nitrogen of the hetero ring is a member of two of the cycles in the tetracyclo ring system.



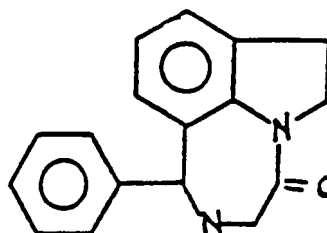
- 495** This subclass is indented under subclass 492. Compounds wherein the hetero ring is in a polycyclo ring system which contains exactly three cycles.

- (1) Note. An example of a compound provided for herein is



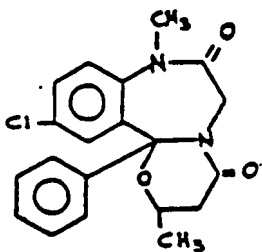
- 496** This subclass is indented under subclass 495. Compounds wherein a nitrogen of the hetero ring is a member of an additional cycle the the tricyclo ring system.

- (1) Note. An example of a compound provided for herein is:



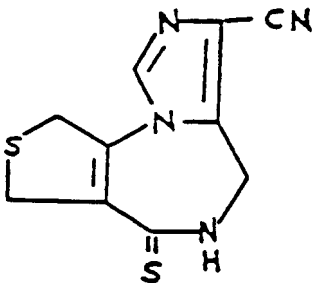
- 497** This subclass is indented under subclass 496. Compounds in which the additional cycle of the tricyclo ring system contains an additional hetero atom.

(1) Note. An example of a compound provided for herein is:



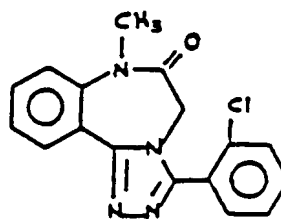
- 498** This subclass is indented under subclass 497. Compounds in which the additional cycle is five-membered and consists of nitrogen and carbon.

(1) Note. An example of a compound provided for herein is:



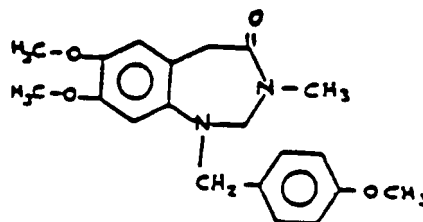
- 499** This subclass is indented under subclass 498. Compounds wherein the additional hetero ring consists of three nitrogens and two carbons.

(1) Note. An example of a compound provided for herein is:



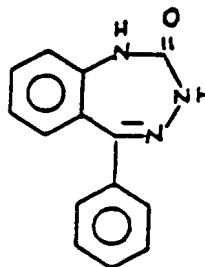
- 500** This subclass is indented under subclass 492. Compounds wherein the hetero ring is in a polycylo ring system which contains exactly two cyclos.

(1) Note. An example of a compound provided for herein is:



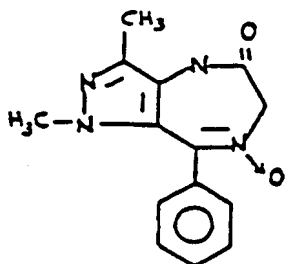
- 501** This subclass is indented under subclass 500. Compounds in which the hetero ring contains at least three nitrogen atoms.

(1) Note. An example of a compound provided for herein is:



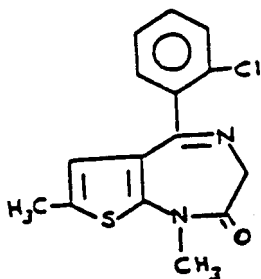
- 502** This subclass is indented under subclass 500. Compounds wherein the other cycle of the bicyclo ring system contains a hetero atom.

(1) Note. An example of a compound provided for herein is:

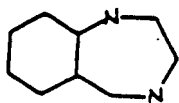


- 503** This subclass is indented under subclass 502. Compounds wherein the other cyclo of the bicyclo ring system contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

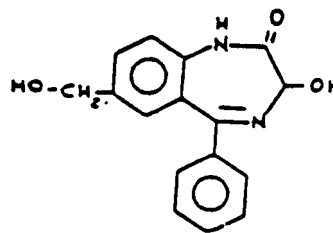
(1) Note. An example of a compound provided for herein is:



- 504** This subclass is indented under subclass 500. Compounds wherein the bicyclo ring system has the following structure, which may contain double bonds between its members

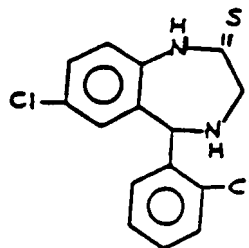


(1) Note. An example of a compound provided for herein is:



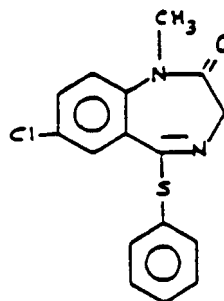
- 505** This subclass is indented under subclass 504. Compounds wherein the chalcogen double bonded directly to the hetero ring is sulfur.

(1) Note. An example of a compound provided for herein is:



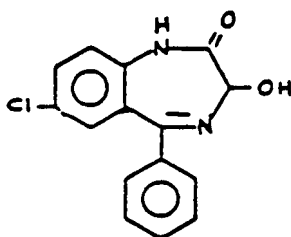
- 506** This subclass is indented under subclass 504. Compounds wherein an additional chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to a ring carbon of the hetero ring.

(1) Note. An example of a compound provided for herein is:



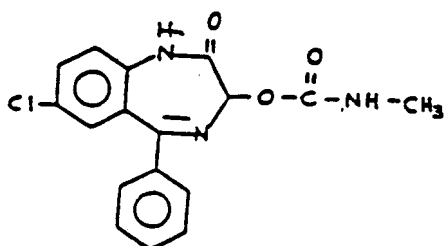
- 507** This subclass is indented under subclass 506. Compounds wherein the additional chalcogen is bonded directly at the 3-position of the bicyclo ring system.

(1) Note. An example of a compound provided for herein is:



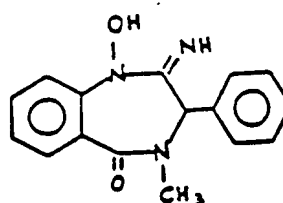
- 508** This subclass is indented under subclass 507. Compounds in which nitrogen or - -, wherein X is chalcogen (i.e., oxygen, sulfur selenium or tellurium), is in the 3-position substituent and attached indirectly to the hetero ring by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



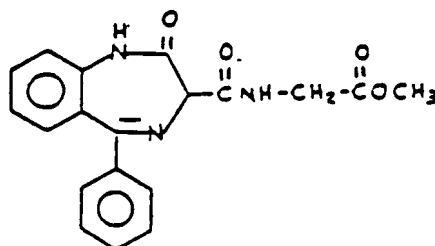
- 509** This subclass is indented under subclass 504. Compounds in which acyclic nitrogen is bonded directly to the hetero ring.

(1) Note. An example of a compound provided for herein is:



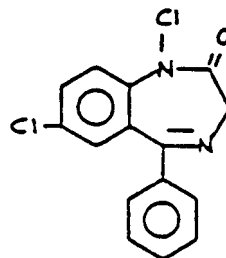
- 510** This subclass is indented under subclass 504. Compounds in which - C - wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly to the hetero ring.

(1) Note. An example of a compound provided for herein is:



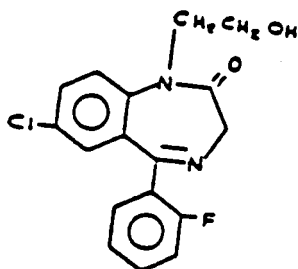
- 511** This subclass is indented under subclass 504. Compounds in which halogen is bonded directly to the hetero ring.

(1) Note. An example of a compound provided for herein is:



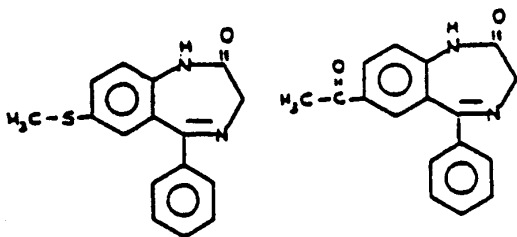
- 512** This subclass is indented under subclass 504. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to a nitrogen of the hetero ring by acyclic nonionic bonding.

- (1) Note. An example of compound provided for herein is:



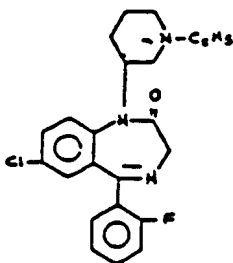
- 513** This subclass is indented under subclass 504. Compounds in which sulfur, - -, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), or nitrogen, other than as nitro or nitroso (-NO₂ or -NO) is bonded directly to the carbocyclic ring of the bicyclo ring system.

- (1) Note. Examples of compounds provided here herein are:



- 514** This subclass is indented under subclass 504. Compounds wherein the 1-position substituent of the bicyclo ring system contains nitrogen.

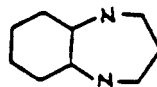
- (1) Note. An example of a compound provided for herein is:



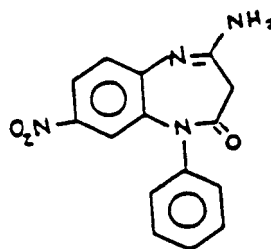
- 515** This subclass is indented under subclass 504. Processes whereby benzophenones or imine derivative thereof are cyclized to form the bicyclo ring system.

- 516** This subclass is indented under subclass 504. Processes whereby the compound containing the bicyclo ring system is prepared from a compound containing a different hetero ring.

- 517** This subclass is indented under subclass 500. Compounds wherein the bicyclo ring system has the following structure, which may contain double bonds between its members:

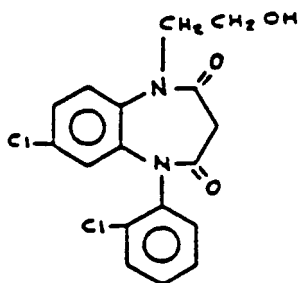


- (1) Note. An example of a compound provided for herein is:



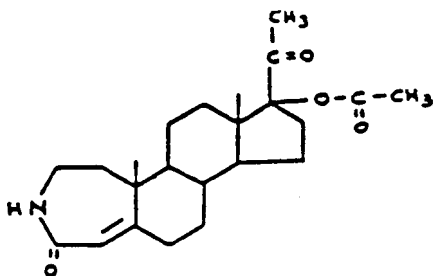
- 518** This subclass is indented under subclass 517. Compounds wherein an additional chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is double bonded directly to a ring carbon of the hetero ring.

- (1) Note. An example of a compound provided for herein is:



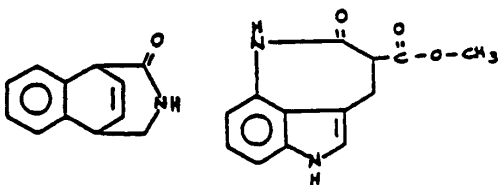
- 519 This subclass is indented under subclass 485. Compounds wherein the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



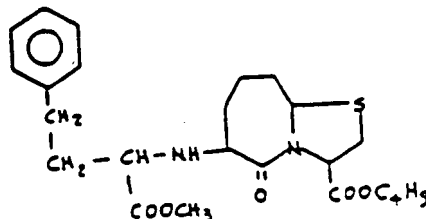
- 520 This subclass is indented under subclass 519. Compounds wherein (a) at least three members of one cyclone are members of an additional cyclone in the polycyclo ring system or (b) one ring member is a member of three of the cyclos in the polycyclo ring system (e.g., bridged, peri-fused, etc.).

(1) Note. Examples of compounds provided for herein are:



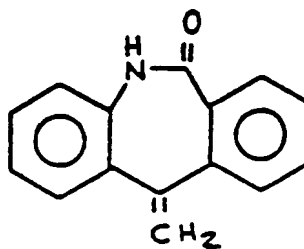
- 521 This subclass is indented under subclass 519. Compounds wherein the polycyclo ring system contains at least two hetero atoms.

(1) Note. An example of a compound provided for herein is:



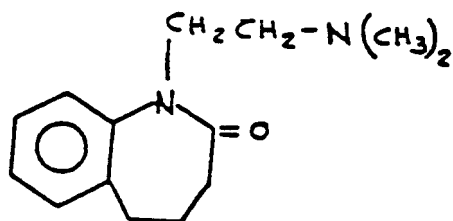
- 522 This subclass is indented under subclass 519. Compounds in which the polycyclo ring system consists of exactly three rings.

(1) Note. An example of a compound provided for herein is:



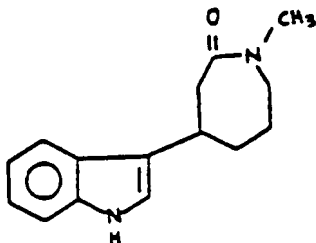
- 523 This subclass is indented under subclass 519. Compounds in which the polycyclo ring system consists of exactly two rings.

(1) Note. An example of a compound provided for herein is:



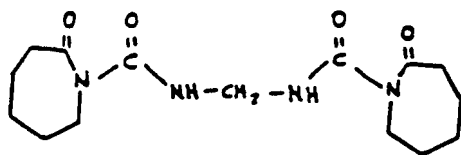
- 524** This subclass is indented under subclass 485. Compounds which contain at least two hetero rings.

(1) Note. An example of a compound provided for herein is:



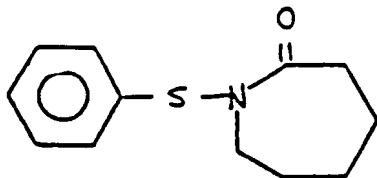
- 525** This subclass is indented under subclass 524. Compounds which contains at least two seven-membered hetero rings.

(1) Note. An example of a compound provided for herein is:



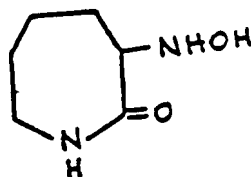
- 526** This subclass is indented under subclass 485. Compounds wherein additional chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the hetero ring.

(1) Note. An example of a compound provided for herein is:



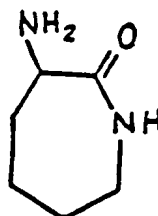
- 527** This subclass is indented under subclass 485. Compounds in which nitrogen is bonded directly to the hetero ring.

(1) Note. An example of a compound provided for herein is:



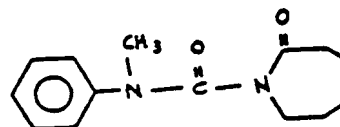
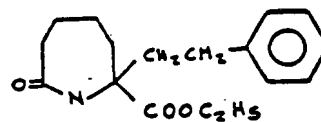
- 528** This subclass is indented under subclass 527. Compounds wherein the nitrogen is bonded additionally only to hydrogen, i.e., -NH2.

(1) Note. An example of a compound provided for herein is:



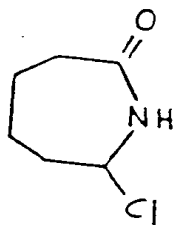
- 529** This subclass is indented under subclass 485. Compounds in which -C- where X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly to the hetero ring.

(1) Note. Examples of compounds provided for herein are:



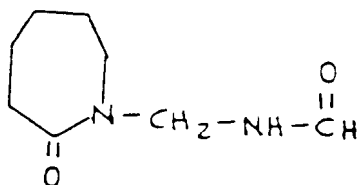
- 530** This subclass is indented under subclass 485. Compounds wherein halogen is bonded directly to the hetero ring.

- (1) Note. An example of a compound provided for herein is:



- 531** This subclass is indented under subclass 485. Compounds in which nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to the hetero ring by non-ionic bonding.

- (1) Note. An example of a compound provided for herein is:



- 532** This subclass is indented under subclass 485. Processes whereby the compound containing the seven-membered hetero ring is prepared from a heterocyclic compounds.

- 533** This subclass is indented under subclass 532. Processes wherein the hetero ring in the heterocyclic reactant is a lactam; i.e., contains -NH- as part of the ring, wherein X is chalcogen (i.e., oxygen, selenium or tellurium) and substitution may be made for the hydrogen only.

- 534** This subclass is indented under subclass 485. Processes whereby the compound containing the seven-membered hetero ring is prepared from a compound containing a cycloaliphatic ring.

- 535** This subclass is indented under subclass 534. Processes wherein the reactant is a cyclic oxime.

- 536** This subclass is indented under subclass 535. Processes wherein the reaction involves a rearrangement which occurs in a gaseous phase.

- 537** Processes under 534 wherein acyclic -X-, wherein the X's are the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium), is attached directly to the cycloaliphatic ring of the reactant by nonionic bonding.

- 538** This subclass is indented under subclass 485. Processes whereby the hetero ring is formed by cyclization.

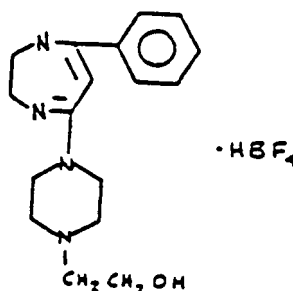
- 539** This subclass is indented under subclass 538. Processes wherein a reactant contains a cyano group (i.e., -CN).

- 540** This subclass is indented under subclass 485. Processes wherein the lactam is separated from impurities or from the reaction medium.

- 541** This subclass is indented under subclass 484. Compounds which contain boron or a metal having a specific gravity greater than four.

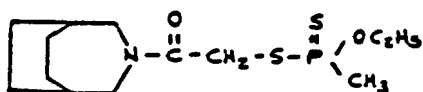
- (1) Note. Arsenic is considered a metal for purposes of this subclass.

- (2) Note. An example of a compound provided for herein is:



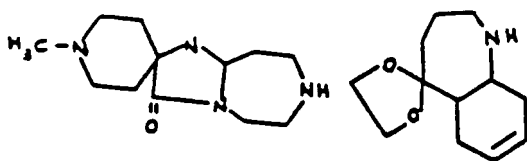
- 542** This subclass is indented under subclass 484. Compounds wherein phosphorus is attached directly or indirectly to the hetero ring by non-ionic bonding.

- (1) Note. An example of a compound provided for herein is:



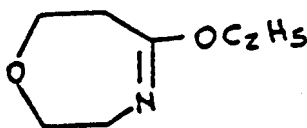
543 This subclass is indented under subclass 484. Compounds which contain a spiro ring system.

(1) Note. Examples of compounds provided for herein are:



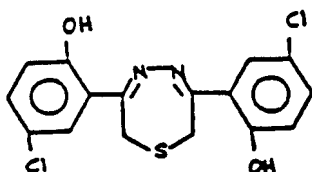
544 This subclass is indented under subclass 484. Compounds in which the hetero ring contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:



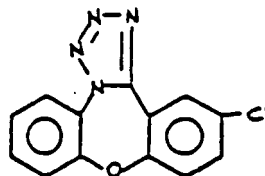
545 This subclass is indented under subclass 544. Compounds wherein the hetero ring contains at least two nitrogens.

(1) Note. An example of a compound provided for herein is:



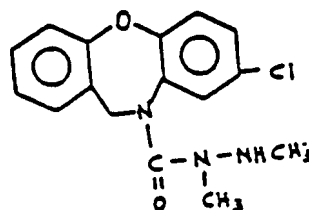
546 This subclass is indented under subclass 544. Compounds wherein the hetero ring is one of the cycles of a polycyclic ring system.

(1) Note. An example of a compound provided for herein is:



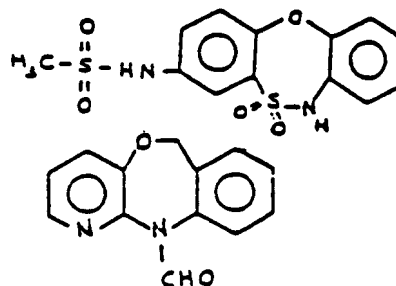
547 This subclass is indented under subclass 546. Compounds in which the polycyclic ring system consists of exactly three rings.

(1) Note. An example of a compound provided for herein is:



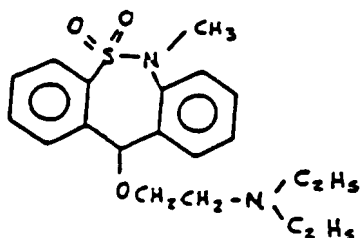
548 This subclass is indented under subclass 547. Compounds wherein the tricyclo ring system contains at least three hetero atoms.

(1) Note. Examples of compounds provided for herein are:



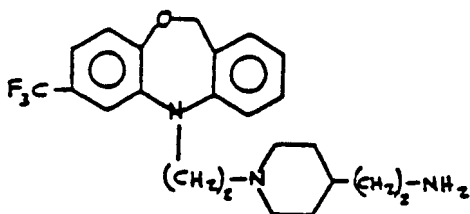
- 549** This subclass is indented under subclass 547. Compounds wherein sulfur and nitrogen are bonded directly to each other in the hetero ring.

(1) Note. An example of a compound provided for herein is:



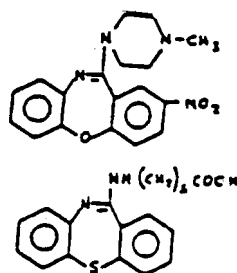
- 550** This subclass is indented under subclass 547. Compounds wherein the nitrogen of the hetero ring is bonded directly to both carbocyclic rings of the tricyclo ring system.

(1) Note. An example of a compound provided for herein is:



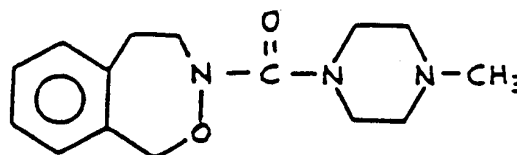
- 551** This subclass is indented under subclass 547. Compounds in which nitrogen is bonded directly to a ring carbon of the seven-membered hetero ring.

(1) Note. Examples of compounds provided for herein are:



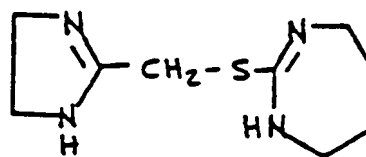
- 552** This subclass is indented under subclass 546. Compounds wherein the polycyclo ring system consists of exactly two rings.

(1) Note. An example of a compound provided for herein is:



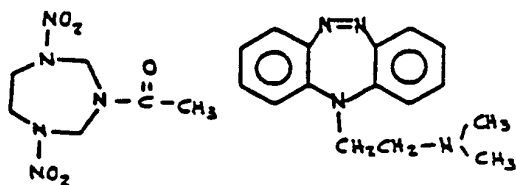
- 553** This subclass is indented under subclass 484. Compounds in which the hetero ring contains at least two nitrogens.

(1) Note. An example of a compound provided for herein is:



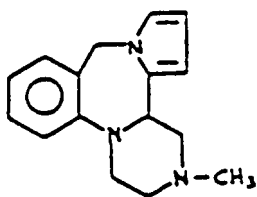
- 554** This subclass is indented under subclass 553. Compounds in which the hetero ring contains three or more nitrogens.

(1) Note. Examples of compounds provided for herein are:



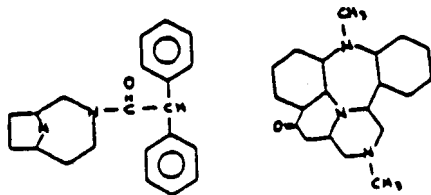
- 555** This subclass is indented under subclass 553. Compounds wherein the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



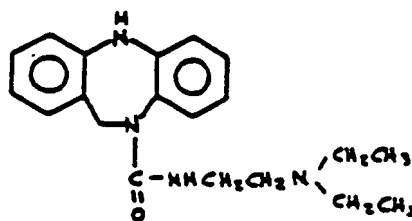
- 556** This subclass is indented under subclass 555. Compounds wherein (a) at least three members of one cyclo are members of an additional cyclo in the polycyclo ring system, or (b) one ring member is a member of three of the cyclos in the polycyclo ring system (e.g., bridged, peri-fused, etc.).

(1) Note. Examples of compounds provided for herein are:



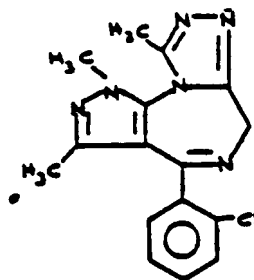
- 557** This subclass is indented under subclass 555. Compounds wherein the polycyclo ring system consists of exactly three rings.

(1) Note. An example of a compound provided for herein is:



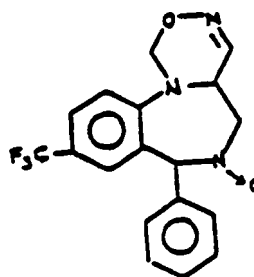
- 558** This subclass is indented under subclass 557. Compounds wherein a nitrogen of the hetero ring is a member of an additional cyclo in the tricyclo ring system.

(1) Note. An example of a compound provided for herein is:



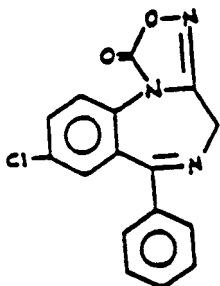
- 559** This subclass is indented under subclass 558. Compounds in which the additional cyclo has at least six ring members.

(1) Note. An example of a compound provided for herein is:



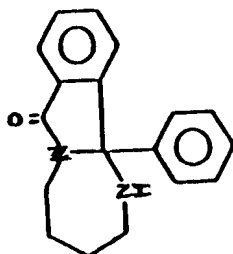
- 560** This subclass is indented under subclass 558. Compounds wherein one of the remaining cyclos of the tricyclo ring system contains chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

- (1) Note. An example of a compound provided for herein is:



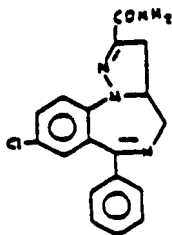
- 561** This subclass is indented under subclass 558. Compounds wherein the additional cyclo is five-membered consisting of one nitrogen and four carbons.

- (1) Note. An example of a compound provided for herein is:

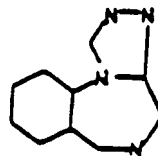


- 562** This subclass is indented under subclass 558. Compounds wherein the additional cyclo is five-membered consisting of two nitrogens and three carbons.

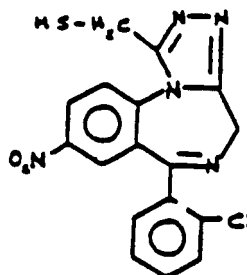
- (1) Note. An example and compound provided for herein is:



- 563** This subclass is indented under subclass 558. Compounds wherein the tricyclo ring system has the following structure, which may contain double bonds between its members:

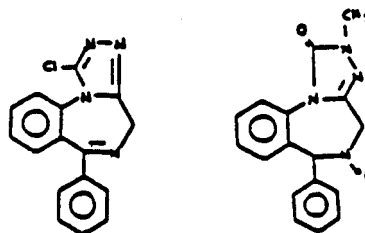


- (1) Note. An example of a compound provided for herein is:



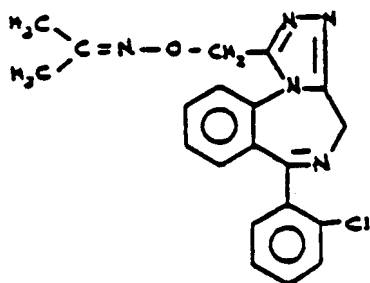
- 564** This subclass is indented under subclass 563. Compounds wherein nitrogen, halogen, cyano (i.e., -CN) or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to a ring carbon of the triazolo ring.

- (1) Note. Examples of compounds provided for herein are:



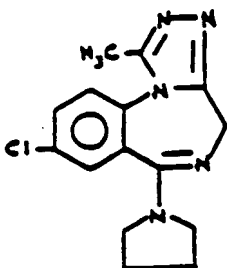
- 565** This subclass is indented under subclass 563. Compounds wherein nitrogen is attached indirectly to ring carbon of the triazolo ring by acyclic nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



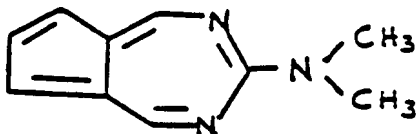
- 566** This subclass is indented under subclass 563. Compounds in which the unshared ring carbon of the triazolo ring is unsubstituted or substituted by alkyl only.

(1) Note. An example of a compound provided for herein is:



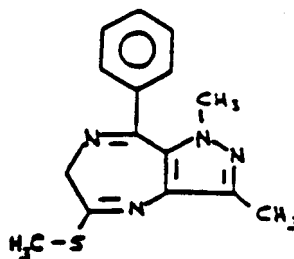
- 567** This subclass is indented under subclass 555. Compounds wherein the polycyclo ring system consists of exactly two rings.

(1) Note. An example of a compound provided for herein is:

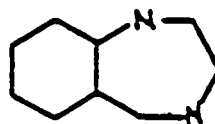


- 568** This subclass is indented under subclass 567. Compounds wherein the other cyclo of the bicyclo ring system contains a hetero atom.

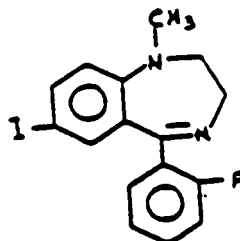
(1) Note. An example of a compound provided for herein is:



- 569** This subclass is indented under subclass 567. Compounds wherein the bicyclo ring system has the following structure, which may contain double bonds between its members:

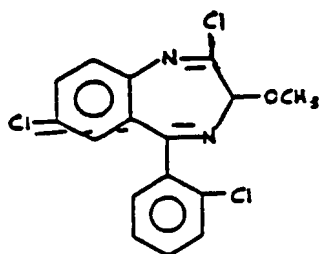


(1) Note. An example of a compound provided for herein is:



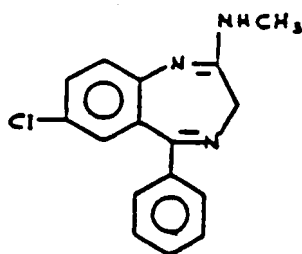
- 570** This subclass is indented under subclass 569. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to ring carbon of the hetero ring.

(1) Note. An example of a compound provided for herein is:



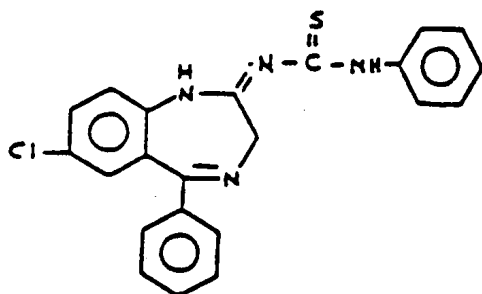
- 571** This subclass is indented under subclass 569. Compounds wherein nitrogen is bonded directly to ring carbon of the hetero ring.

(1) Note. An example of a compound provided for herein is:



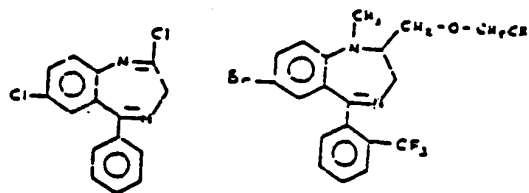
- 572** This subclass is indented under subclass 571. Compounds wherein nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to ring carbon of the hetero ring by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



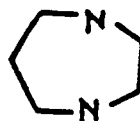
- 573** This subclass is indented under subclass 569. Compounds wherein nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to ring carbon of the hetero ring by acyclic nonionic bonding.

(1) Note. Examples of compounds provided for herein are:

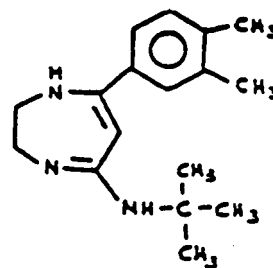


- 574** This subclass is indented under subclass 569. Processes for the formation of the 1,4-benzodiazepine ring system, or hydrogenated forms thereof.

- 575** This subclass is indented under subclass 553. Compounds wherein the hetero ring has the following structure, which may contain double bonds between its members:

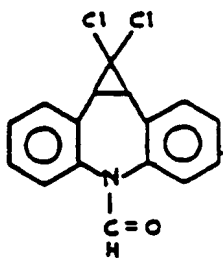


(1) Note. An example of a compound provided for herein is:



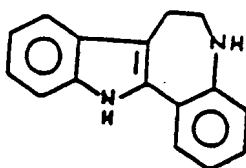
- 576** This subclass is indented under subclass 484. Compounds wherein the hetero ring is one of the cyclos of a polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



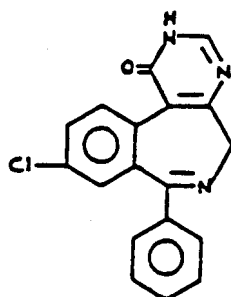
- 577 This subclass is indented under subclass 576. Compounds wherein an additional cycle of the polycyclo ring system contains nitrogen.

(1) Note. An example of a compound provided for herein is:



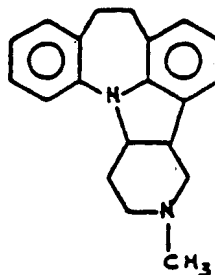
- 578 This subclass is indented under subclass 577. Compounds wherein the polycyclo ring system contains at least three hetero atoms.

(1) Note. An example of a compound provided for herein is:



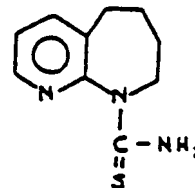
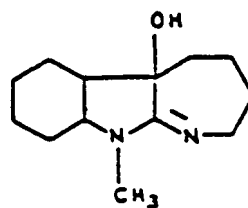
- 579 This subclass is indented under subclass 578. Compounds wherein the nitrogen of the hetero ring is a member of an additional cycle of the polycyclo ring system.

(1) Note. An example of a compound provided for herein is:



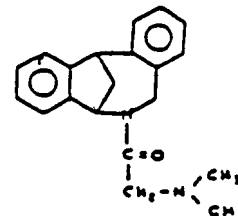
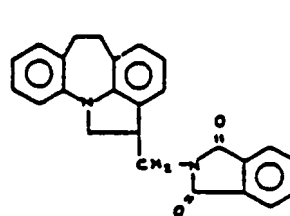
- 580 This subclass is indented under subclass 577. Compounds wherein the seven-membered hetero ring shares ring members with one other cyclo only.

(1) Note. Examples of compounds provided for herein are:



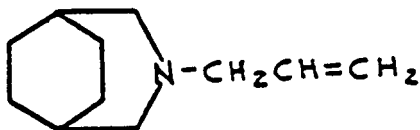
- 581 This subclass is indented under subclass 576. Compounds wherein (a) at least three members of one cyclo are members of an additional cyclo in the polycyclo ring system, or (b) one ring carbon is a member of three of the cyclos in the polycyclo ring system (e.g., bridged, peri-fused, etc.).

(1) Note. Examples of compounds provided for herein are:



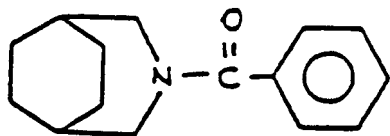
- 582 This subclass is indented under subclass 581. Compounds wherein the polycyclo ring system consists of exactly two rings.

- (1) Note. An example of a compound provided for herein is:



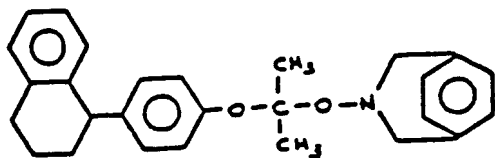
- 583** This subclass is indented under subclass 582. Compounds in which- - wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly to the ring nitrogen of the bicyclo ring system.

- (1) Note. An example of a compound provided for herein is:



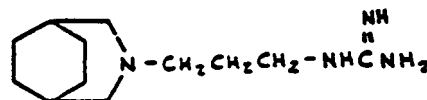
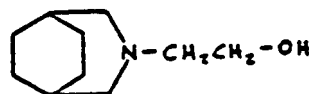
- 584** This subclass is indented under subclass 582. Compounds wherein nitrogen of chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached directly to the ring nitrogen of the bicyclo ring system by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



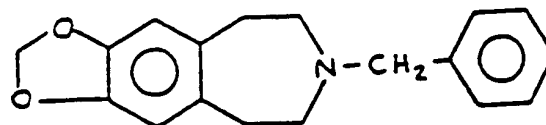
- 585** This subclass is indented under subclass 582. Compounds wherein nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to the ring nitrogen of the bicyclo ring system by acyclic nonionic bonding.

- (1) Note. Examples of compounds provided for herein are:



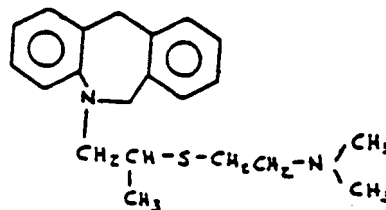
- 586** This subclass is indented under subclass 576. Compounds wherein the polycyclo ring system consists of exactly three rings.

- (1) Note. An example of a compounds provided for herein is:



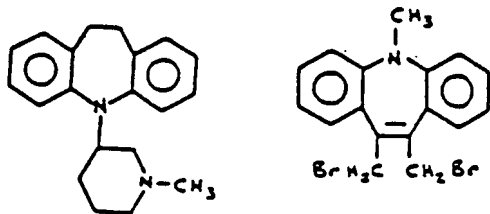
- 587** This subclass is indented under subclass 586. Compounds wherein the hetero ring shares ring members with each of two benzene rings in the tricyclo ring system.

- (1) Note. An example of a compound provided for herein is:



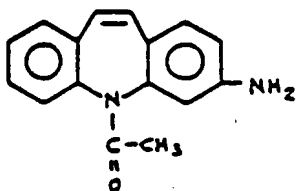
- 588** This subclass is indented under subclass 587. Compounds wherein the nitrogen of the hetero ring is bonded directly to each of the two benzene rings.

- (1) Note. Examples of compounds provided for herein are:



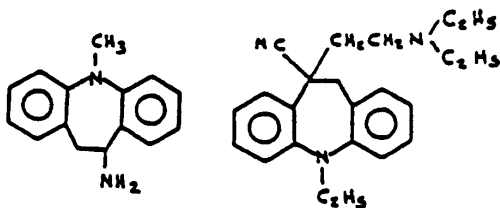
- 589** This subclass is indented under subclass 588. Compounds in which -C- wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), is bonded directly to the ring nitrogen of the tricyclo ring system.

(1) Note. An example of a compound provided for herein is:



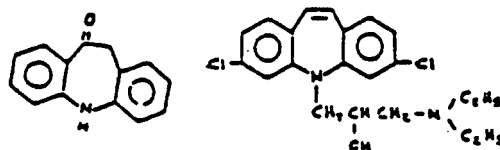
- 590** This subclass is indented under subclass 588. Compounds wherein nitrogen is attached directly or indirectly to carbon of the hetero ring by acyclic nonionic bonding.

(1) Note. Example of compounds provided for herein are:



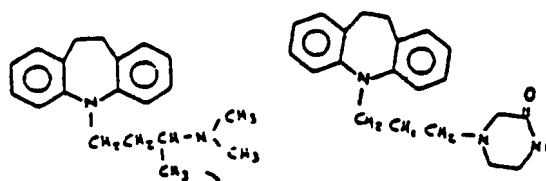
- 591** This subclass is indented under subclass 588. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached directly or indirectly to the hetero ring by acyclic nonionic bonding.

(1) Note. Examples of compounds provided for herein are:



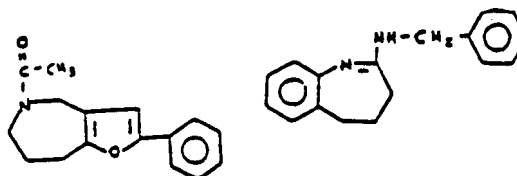
- 592** This subclass is indented under subclass 588. Compounds wherein nitrogen is attached indirectly to the nitrogen of the hetero ring by acyclic nonionic bonding.

(1) Note. Examples of compounds provided for herein are:

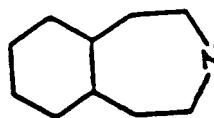


- 593** This subclass is indented under subclass 576. Compounds wherein the polycyclo ring system consists of exactly two rings.

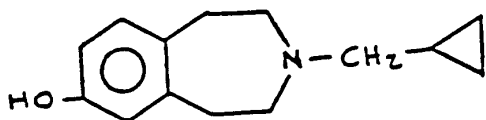
(1) Note. Examples of compounds provided for herein are:



- 594** This subclass is indented under subclass 593. Compounds wherein the bicyclo ring system has the following structure, which may contain double bonds between its members:

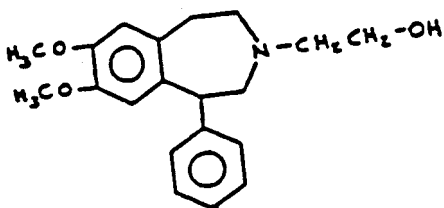


(1) Note. An example of a compound provided for herein is:



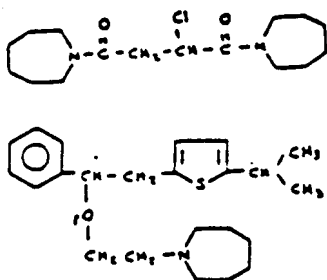
- 595** This subclass is indented under subclass 594. Compounds in which a benzene ring is bonded directly to a ring carbon of the hetero ring.

(1) Note. An example of a compound provided for herein is:



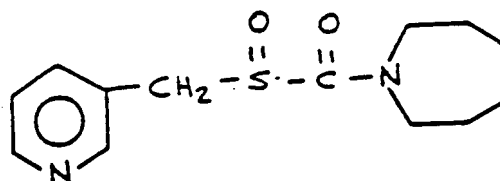
- 596** This subclass is indented under subclass 484. Compounds wherein an additional hetero ring is attached directly or indirectly to the hetero ring by nonionic bonding.

(1) Note. Examples of compounds provided for herein are:



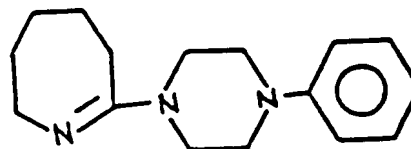
- 597** This subclass is indented under subclass 596. Compounds wherein the additional hetero ring is six-membered and contains nitrogen.

(1) Note. An example of a compound provided for herein is:



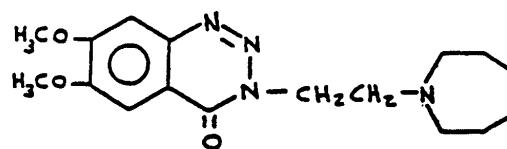
- 598** This subclass is indented under subclass 597. Compounds wherein the additional hetero rings contains at least two hetero atoms.

(1) Note. An example of a compound provided for herein is:



- 599** This subclass is indented under subclass 598. Compounds wherein the additional hetero ring is one of the cyclos of a polycyclo ring system.

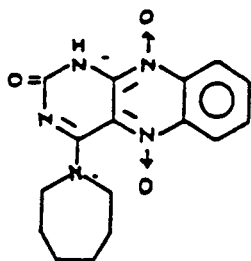
(1) Note. An example of a compound provided for herein is:



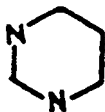
- 600** This subclass is indented under subclass 599. Compounds wherein the additional hetero ring has the following structure, which may contain double bonds between its members:



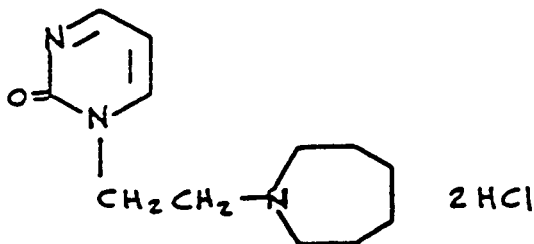
- (1) Note. An example of a compound provided for herein is:



- 601** This subclass is indented under subclass 598. Compounds wherein the additional hetero ring has the following structure, which may contain double bonds between its members:

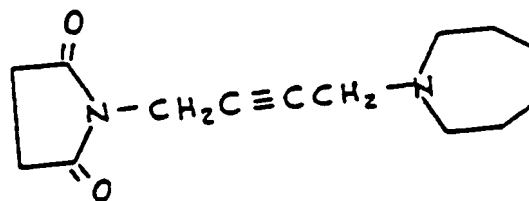


- (1) Note. An example of a compound provided for herein is:



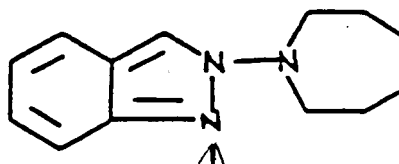
- 602** This subclass is indented under subclass 596. Compounds wherein the additional hetero ring is five-membered and contains nitrogen.

- (1) Note. An example of a compound provided for herein is:



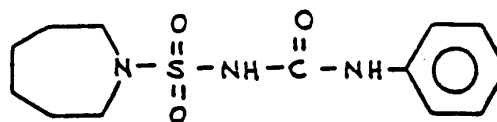
- 603** This subclass is indented under subclass 602. Compounds wherein the additional hetero atoms.

- (1) Note. An example of a compound provided for herein is:



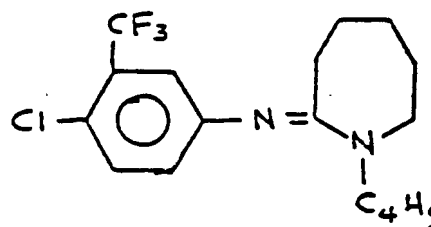
- 604** This subclass is indented under subclass 484. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached directly to the hetero ring by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



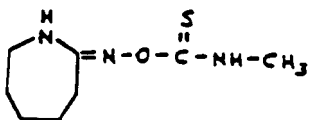
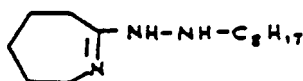
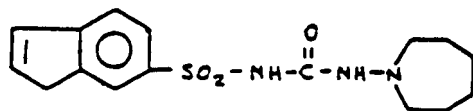
- 605** This subclass is indented under subclass 484. Compounds in which nitrogen is attached directly to the hetero ring by nonionic bonding.

- (1) Note. An example of a compound provided for herein is:



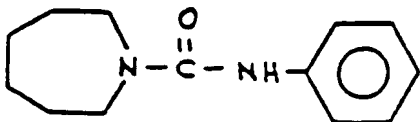
606 This subclass is indented under subclass 605. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium), - - , wherein X is chalcogen, or additional nitrogen is attached directly to the nitrogen by nonionic bonding.

- (1) Note. Examples of compounds provided for herein are:



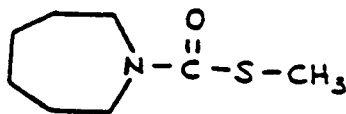
607 This subclass is indented under subclass 484. Compounds in which- - wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the hetero ring nitrogen.

- (1) Note. An example of a compound provided for herein is:



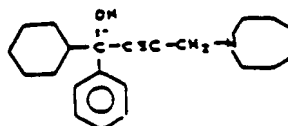
608 This subclass is indented under subclass 607. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to the - - group.

- (1) Note. An example of a compound provided for herein is:



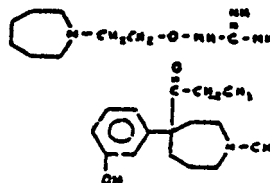
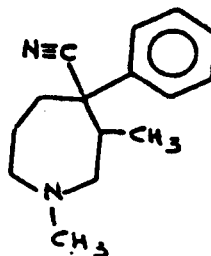
609 This subclass is indented under subclass 484. Compounds wherein nitrogen or chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to the hetero ring by acyclic nonionic bonding.

- (1) Note. Examples of compounds provided for herein are:



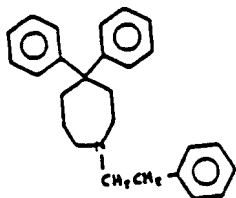
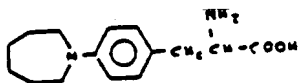
610 This subclass is indented under subclass 609. Compounds in which the chalcogen or nitrogen is attached directly to carbon by a multiple bond (i.e., double or triple bond).

- (1) Note. Examples of compounds provided for herein are:



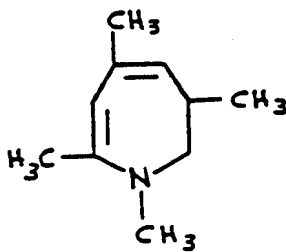
611 This subclass is indented under subclass 484. Compounds in which a benzene ring is bonded directly to the hetero ring.

- (1) Note. Examples of compounds provided for herein are:



612 This subclass is indented under subclass 484. Compounds wherein the hetero ring is either unsubstituted or alkyl substituted only.

- (1) Note. An example of a compound provided for herein is:



END